

Operating Manual

Version 1.0.1

Gear drilling & milling machine

OPTI[®]drill[®]
DH40CTPE

Part no. 3035353



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Preface

Dear customer,

Thank you very much for purchasing a product made by OPTIMUM.

OPTIMUM metal working machines offer a maximum of quality, technically optimum solutions and convince by an outstanding price performance ratio. Continuous enhancements and product innovations guarantee state-of-the-art products and safety at any time.

Before commissioning the machine please thoroughly read these operating instructions and get familiar with the machine. Please also make sure that all persons operating the machine have read and understood the operating instructions beforehand.

Keep these operating instructions in a safe place nearby the machine.

Information

The operating instructions include indications for safety-relevant and proper installation, operation and maintenance of the machine. The continuous observance of all notes included in this manual guarantee the safety of persons and of the machine.

The manual determines the intended use of the machine and includes all necessary information for its economic operation as well as its long service life.

In the paragraph "Maintenance" all maintenance works and functional tests are described which the operator must perform in regular intervals.

The illustration and information included in the present manual can possibly deviate from the current state of construction of your machine. Being the manufacturer we are continuously seeking for improvements and renewal of the products. Therefore, changes might be performed without prior notice. The illustrations of the machine may be different from the illustrations in these instructions with regard to a few details. However, this does not have any influence on the operability of the machine.

Therefore, no claims may be derived from the indications and descriptions. Changes and errors are reserved!

Your suggestion with regard to these operating instructions are an important contribution to optimising our work which we offer to our customers. For any questions or suggestions for improvement, please do not hesitate to contact our service department.

If you have any further questions after reading these operating instructions and you are not able to solve your problem with a help of these operating instructions, please contact your specialised dealer or directly the company OPTIMUM.

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1 Safety

Glossary of symbols

▶	provides further instructions
→	calls on you to act
□	listings

This part of the operating instructions

- explains the meaning and use of the warning notes included in these operating instructions,
- defines the intended use of the drilling milling machine,
- points out the dangers that might arise for you or others if these instructions are not observed,
- informs you about how to avoid dangers.

In addition to these operating instructions, please observe

- the applicable laws and regulations,
- the statutory provisions for accident prevention,
- the prohibition, warning and mandatory signs as well as the warning notes on the drilling milling machine.

Always keep this documentation close to the drilling milling machine.

INFORMATION

If you are unable to rectify an issue using these operating instructions, please contact us for advice:

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Dr. Robert-Pfleger-Str. 26
D-96103 Hallstadt
Email: info@optimum-maschinen.de



1.1 Safety instructions (warning notes)

1.1.1 Classification of hazards

We classify the safety warnings into different categories. The table below gives an overview of the classification of symbols (ideogram) and the warning signs for each specific danger and its (possible) consequences.

Symbol	Alarm expression	Definition / consequence
	DANGER!	Impending danger that will cause serious injury or death to people.
	WARNING!	A danger that can cause serious injury or death.
	CAUTION!	A danger or unsafe procedure that can cause personal injury or damage to property.
	ATTENTION!	Situation that could cause damage to the milling machine and product, as well as other types of damage. No risk of injury to persons.
	INFORMATION	Practical tips and other important or useful information and notes. No dangerous or harmful consequences for people or objects.

In case of specific dangers, we replace the pictogram with





or



general danger with a warning of injury to hands, hazardous electrical voltage, rotating parts.

1.1.2 Other pictograms



Warning: danger of slipping! Warning: risk of stumbling! Warning: hot surface! Warning: biological hazard!



Warning: automatic start-up! Warning: tilting danger! Warning: suspended loads! Caution, danger of explosive substances!

DH40CTPE_GB_1.fm



Switching on forbidden!



Read the operating instructions before commissioning!



Pull out the mains plug!



Wear protective glasses!



Wear protective gloves!



Wear safety shoes!



Wear a protective suit!



Use ear protection!



Only switch during standstill!



Protect the environment!



Contact address

1.2 Intended use

WARNING!

In the event of improper use of the drilling- milling machine

- will endanger personnel,
- the drilling- milling machine and other material property of the operating company will be endangered,
- the correct function of the drilling- milling machine may be affected.



The drilling- milling machine is designed and manufactured to be used for milling and drilling cold metals or other non-flammable materials or materials that do not constitute a health hazard by using commercial milling and drilling tools.

The drilling- milling machine must only be installed and operated in a dry and well-ventilated place.

If the drilling- milling machine is used in any way other than described above, modified without the approval of the company Optimum Maschinen Germany GmbH then the CNC machine is being used improperly.

We will not be held liable for any damages resulting from any operation which is not in accordance with the intended use.

We explicitly point out that any construction, technical or process engineering changes that have not been approved by Optimum Maschinen Germany GmbH will render the warranty null and void.

It is also part of the intended use that you

- observe the limits of the drilling- milling machine,
- the operating manual is observed,
- the inspection and maintenance instructions are observed.

► Technical specification on page 17

WARNING!

Severe injuries due to non-intended use.



It is forbidden to make any modifications or alternations to the operation values of the drilling-milling. They could endanger the personnel and cause damage to the drilling- milling machine.

1.3 Reasonably foreseeable misuses

Any use other than that specified under "Intended use" or any use beyond that described will be deemed non-intended use and is not permissible.

Any other use must be discussed with the manufacturer.

It is only allowed to process metal, cold and non-inflammable materials with the drilling- milling machine.

In order to avoid misuse, it is necessary to read and understand the operating instructions before first commissioning.

Operators must be qualified.

1.3.1 Avoiding misuse

- Use of suitable cutting tools.
- Adapting the speed adjustment and feed to the material and workpiece.
- Clamp workpieces firmly and free of vibration.
- Risk of fire and explosion due to the use of flammable materials or cooling lubricants.
Before processing inflammable materials (e.g. aluminium, magnesium) or using inflammable auxiliary materials (e.g. spirit), you need to take additional preventive measures in order to avoid health risks.
- When processing plastics, the machine operator must ensure that static electricity generated during the machining process can be discharged easily.
- When processing carbons, graphite and carbon-fibre-reinforced carbons, the machine is no longer being used as intended. This causes the warranty to be null and void. When processing carbons, graphite and carbon-fibre-reinforced carbons and similar materials, the machine can be damaged extremely quickly, even if the dusts generated are completely sucked out during the work process.

ATTENTION!

The workpiece is always to be fixed by a machine vice, jaw chuck or by another appropriate clamping tool such as for the clamping claws.



WARNING!

Risk of injury caused by flying workpieces.

- Clamp the workpiece in the machine vice. Make sure that the workpiece is firmly clamped in the machine vice and that the machine vice is firmly clamped onto the machine table.
 - Use cooling and lubricating agents to increase the durability of the tool and to improve the surface quality.
 - Clamp the cutting tools and workpieces on clean clamping surfaces.
 - Sufficiently lubricate the machine.
 - Set the bearing clearance and guides correctly.



Recommendations:

- Insert the drill in a way that it is exactly positioned between the three clamping jaws of the quick action chuck.
- Clamp end mills (or shank cutters) in a collet chuck using the corresponding collets.
- Clamp end face mills using shell end mill arbors.

When drilling, make sure that

- the suitable speed is set depending on the diameter of the drill,
- the pressure must only be such that the drill can cut without load,

- if there is too much pressure, the drill will wear quickly and may even break or jam in the borehole. If the drill gets jammed immediately stop the main motor by pressing the emergency stop button,
- use commercial cooling/lubricating agents for hard materials, e.g. steel and
- generally always back the spindle out of the workpiece while it is still turning.

ATTENTION!

Do not use the quick action drill chuck for milling tools. Never clamp a milling cutter into a quick action drill chuck. Use a collet chuck and appropriate collets for end mills.



When milling, ensure that

- the right cutting speed is selected;
- for workpieces with normal strength values, e.g. steel, 18-22 m/min,
- for workpieces with high strength values, 10-14 m/min,
- the pressure is selected so that the cutting speed remains constant,
- normal trade coolants/lubricants are used for hard materials.

1.4 Possible dangers caused by the drilling- milling machine

The drilling- milling machine was built using state-of-the-art technology.

Nevertheless, there is a residual risk as the drilling- milling machine operates with

- high speeds,
- circulating parts and tools and
- electrical voltage and currents.

We have used design and safety engineering to minimize the health risk to personnel resulting from these hazards.

If the drilling-milling machine is used and maintained by personnel who are not duly qualified, there may be a risk resulting from incorrect or unsuitable maintenance of the drilling- milling machine.

INFORMATION

Everyone involved in the assembly, commissioning, operation and maintenance must

- be duly qualified,
- and strictly follow these operating instructions.

Always disconnect the drilling- milling machine from the electrical power supply before performing cleaning or maintenance tasks.



WARNING!

The drilling- milling machine may only be operated with functional safety devices.

Disconnect the drilling- milling machine immediately, whenever you detect a failure in the safety devices or when they are not fitted!

All additional devices installed by the operator must be equipped with the stipulated safety devices.

This is your responsibility as the operator!



1.5 Personnel qualification

1.5.1 Target group

This manual is addressed to

- operators,
- users and
- maintenance personnel.

Therefore, the warning notes refer to both, operation and maintenance personnel of the drilling-milling machine.

WARNING!

Always disconnect the drilling- milling machine from the electrical power supply. This will prevent it from being used by unauthorized persons.

The qualifications of the personnel for the different tasks are mentioned below:

Operator

The user must have been instructed by the operator about the assigned tasks and possible risks in case of improper behaviour. The user may only carry out tasks that exceed normal operation if this is stated in these instructions and the operator has explicitly entrusted him with the task.

Qualified electrician

With professional training, knowledge and experience as well as knowledge of respective standards and regulations, qualified electricians are able to perform work on the electrical system and recognise and avoid any possible dangers.

Qualified electricians have been specially trained for the working environment, in which they are working and know the relevant standards and regulations.

Qualified personnel

Due to their professional training, knowledge and experience as well as knowledge of relevant regulations, qualified personnel are able to perform the assigned tasks and to independently recognise and avoid any possible dangers.

Instructed person

Instructed persons were instructed by the operating company regarding the assigned tasks and any possible risks of improper behaviour.

INFORMATION

Everyone involved in the assembly, commissioning, operation and maintenance must

- be duly qualified,
- and strictly follow these operating instructions.

In the event of improper use

- there may be a risk to personnel,
- there may be a risk of damage to the drilling- milling machine and other material values,
- the correct function of the drilling- milling machine may be affected.

1.5.2 Authorized persons

WARNING!

Inappropriate operation and maintenance of the milling machine constitutes a danger to the personnel, objects and the environment.

Only authorized personnel may operate the milling machine !

Authorized operating and maintenance personnel are specialists instructed and trained by the operator and the manufacturer.

1.5.3 Obligations of the operating company

The operator must instruct personnel at least once a year in

- all safety regulations relevant to the machine,



- its operation and
- generally accepted engineering standards.

The operator must also

- check the personnel's knowledge level,
- document the training/instruction,
- have attendance at the training/instruction confirmed by signature and
- check whether personnel is working in a manner that shows awareness of safety and risks.
- Define and document the machine inspection deadlines in accordance with section 3 of the Factory Safety Order and perform an operational risk analysis in accordance with section 6 of the Safety at Work Act.

1.5.4 User's obligations

The user must

- have read and understood the operating instructions,
- be familiar with all safety devices and regulations and
- be able to operate the machine.

1.5.5 Additional requirements regarding qualification

The following additional requirements apply for work on electrical components or equipment:

- They must only be performed by a qualified electrician or person working under the instructions and supervision of a qualified electrician.

Before starting work on electrical parts or operating agents, the following actions must be taken in the order given:

- disconnect all poles,
- secure against restarting,
- check that there is no voltage.

1.6 User positions

The user position is in front of the drilling- milling machine.

1.7 Safety measures during operation

CAUTION!

Danger due to inhaling dust and mist that are hazardous to health.

Depending on the materials to be machined and the agents used, dusts and mists can arise that are detrimental to health.

Ensure that the harmful dust and mist generated are safely sucked off at the point of origin and routed away from the working area or filtered. To do so, use a suitable extraction unit.



CAUTION!

Risk of fire and explosion by using flammable materials or cooling lubricants.

Extra precautionary measures must be taken before machining flammable materials (e.g. aluminium, magnesium) or using combustible agents (e.g. spirit) to avert a health hazard.



1.8 Safety devices

Use the drilling- milling machine only with properly functioning safety devices.

Stop the drilling- milling machine immediately, if a safety device fails or is faulty or becomes ineffective.

It is your responsibility!

If a safety device has been activated or has failed, the drilling- milling machine must only be used if you

- the cause of the fault has been eliminated,
- have verified that there is no danger to personnel or objects.

WARNING!

If you bypass, remove or deactivate a safety device in any other way, you are endangering yourself and other personnel working with the drilling- milling machine. The possible consequences are:



- injuries due to components or workpieces flying off at high speed,
- contact with rotating parts and
- fatal electrocution.

The drilling- milling machine features the following safety devices:

- An emergency stop push button,
- a protective cover on the drilling / milling head.

WARNING!

Although the isolating safety devices provided and delivered with the machine are designed to reduce the risks of workpieces being ejected or parts of tools or workpieces breaking off, they cannot eliminate these risks completely. Always work carefully and observe the limits of the machining process.



1.8.1 Emergency stop push button

The emergency stop (1) switches off the drilling- milling machine.



Img. 1-1: Emergency stop

ATTENTION!

The emergency switching off push button immediately stops the operation of the drilling- milling machine.

Press the emergency switching off push button only if there is a risk! If this push button is actuated in order to switch off the drilling- milling machine in the standard operation the tool or workpiece might get damaged.

After having actuated the emergency switching off push button, turn the knob to the right in order to restart the machine.



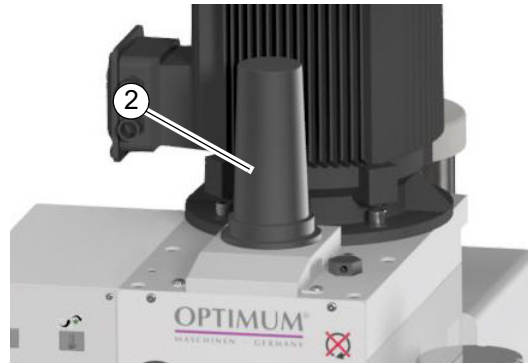
1.8.2 Protective cover

The drilling / milling head is equipped with a protective cover (2).

WARNING!

Do not remove the protective cover until the main switch of the drilling/milling machine has been switched off.

Attach the protective cover immediately after every tool change.



Img. 1-2: Protective cover



1.8.3 Lockable master switch

The lockable master switch can be secured in the "0" position by means of a padlock to guard against the milling machine being switched on accidentally or by an unauthorised person.

The power supply is cut off when the master switch is in the off position.

Except for the areas marked by the pictogram in the margin.

WARNING!

Dangerous voltage even if the main switch is switched off. The areas marked by the pictogram might contain live parts, even if the main switch is switched off.



1.8.4 Spindle guard

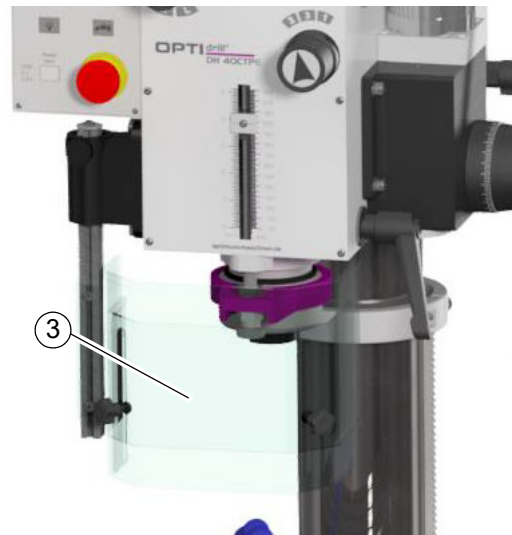
Adjust the guard (3) to the correct height before you start working.

To do so, slacken the clamping screw, set the required height and re-tighten the clamping screw.

There is a switch integrated in the spindle protection mounting which monitors the closed position.

INFORMATION

The machine cannot be started, if the spindle protection is not closed.



Img. 1-3: Spindle guard



1.9 Safety check

Check the drilling- milling machine regularly.

Check all safety devices

- ☐ before starting work,
- ☐ once a week (with the machine in operation) and
- ☐ after all maintenance and repair work.

General check		
Equipment	Check	OK
Guards	Mounted, firmly bolted and not damaged	
Signs, Markers	Installed and legible	

Functional check		
Equipment	Check	OK
Emergency switching off push button	After the emergency switching off push button is pressed, the drilling- milling machine must switch off. It must only be possible to restart the machine, if the emergency switching off push button is unlocked and the ON switch has been pressed.	
Separation guard around the drill and milling spindle	The drilling- milling machine may switch on only when the guard is closed.	

1.10 Personal protective equipment

For certain work, personal protective equipment is required.

Protect your face and your eyes: Wear a safety helmet with facial protection when performing work where your face and eyes are exposed to hazards.

Wear protective gloves when handling pieces with sharp edges.

Wear safety shoes when you assemble, disassemble or transport heavy components.

Use ear protection if the noise level (emission) in the workplace exceeds 80 dB (A).

Before starting work make sure that the required personal protective equipment is available at the work place.

CAUTION!

Dirty or contaminated personnel protective equipment can cause illness. It must be cleaned after each use and at least once a week.

1.11 For your own safety during operation

WARNING!

Before activating the drilling- milling machine, ensure that this will not endanger other persons or cause damage to equipment.

Avoid any unsafe work methods:

Make sure that your operation does not create a safety hazard.

- The rules specified in these operating instructions must be observed during assembly, operation, maintenance and repair.
- Use protective glasses!
- Switch off the drilling- milling machine before measuring the workpiece.
- Do not work on the drilling- milling machine, if your concentration is reduced, for example, because you are taking medication.
- Stay on the drilling- milling machine until the working spindle has come to a complete stand-still.



- Use the specified personal protective equipment. Ensure you wear close-fitting clothing and, if necessary, a hairnet.
- Do not use protective gloves when drilling or milling.
- Disconnect the shock-proof plug from the outlet before replacing the tool.
- Use appropriate agents to remove drilling and milling chips.
- Ensure that your work does not create a safety risk.
- Safely and firmly clamp the workpiece in place, before switching the drilling- milling machine on.

We provide information about the specific dangers when working with and on the drilling- milling machine in the descriptions for these types of work.

1.12 Switching-off and securing the drilling- milling machine

Disconnect the mains plug before starting maintenance and repairs.



1.13 Using lifting equipment

WARNING!

The use of unstable lifting and load suspension equipment that might break under load can cause severe injuries or even death.

Check that the lifting and load suspension equipment are of sufficient load-bearing capability and are in perfect condition.

Observe the accident prevention regulations issued by your Employers Liability Insurance Association or other supervisory authorities applicable to your company.

Fasten the loads properly.

Never walk under suspended loads!



1.14 Electronics

Have the machine and/or the electric equipment checked regularly. Immediately eliminate all defects such as loose connections, defective wires, etc.

A second person must be present during work on live components to disconnect the power in the event of an emergency. If there is a fault in the power supply, switch off the milling machine immediately!

Comply with the required inspection intervals in accordance with the factory safety directive, operating equipment inspection.

The operator of the machine must ensure that the electrical systems and operating equipment are inspected with regards to their proper condition, namely,

- by a qualified electrician or under the supervision and direction of a qualified electrician, prior to initial commissioning and after modifications or repairs, prior to recommissioning
- and at certain intervals.

The deadlines must be set so that arising, foreseeable defects can be detected in a timely manner.

The relevant electro-technical rules must be followed during the inspection.

The inspection prior to initial commissioning is not required if the operator receives confirmation from the manufacturer or installer that the electrical systems and operating equipment comply with the accident prevention regulations, see conformity declaration.

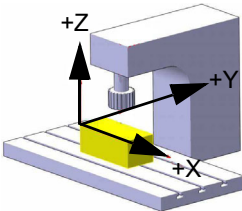
Permanently installed electrical systems and operating equipment are considered constantly monitored if they are continually serviced by qualified electricians and inspected by means of measurements in the scope of operation (e.g. monitoring the insulation resistance).

1.15 Inspection deadlines

Specify the inspection intervals for the machine in accordance with § 3 of the Industrial Safety Regulation, document these and carry out an operational hazard analysis in accordance with § 6 of the Industrial Safety and Health Act. The inspection intervals in the maintenance section should be used as reference values.

2 Technical specification

The following information represents the dimensions and indications of weight and the manufacturer's approved machine data.

2.1 Electrical connection	
Connection	3 x 400V ~ 50Hz (60Hz)
Fusing performed by the operator	16 A
Operating mode, duty cycle	S6 - 60%
2.2 Drilling capacity / milling capacity	
Spindle drive power, 2-stage drive motor Star-delta connection	1.1 / 1.5 kW
Drilling capacity in steel [mm]	32
Continuous drilling capacity in steel [mm]	28
Max. milling head size [mm]	76
Max. end mill cutter size [mm]	25
2.3 Spindle head	
Spindle sleeve stroke [mm]	120
Spindle seat	MT4
Spindle head	360 ° rotatable, 45 ° swiveling
Adjustable in height	260mm
Throat [mm]	280
Distance to machine base [mm]	920 until 1180
Distance to cross table [mm]	0 until 600
2.4 Cross table	
	
Table size Length x Width [mm]	210 x 730
T-slot size / distance / number	14mm / 63 / 3
X axis travel [mm]	480
Y axis travel [mm]	180
Z axis travel [mm]	560
Cross table, max. bearing load	50 kg
2.5 Dimensions	
► Installation plan DH 40CTPE on page 19	
Total weight [kg]	350

DH40CTPE_GB_2.fm

Column diameter [mm]	115
2.6 Work area	
	Keep a work area of at least one metre around the machine free for operation and maintenance.
2.7 Speeds	
Spindle speeds [rpm]	95 - 3200
Number of steps	12
2.8 Spindle quill feed	
via feed motor [mm/rev], three levels	automatic 0.10 0.18 0.26
option [mm/min], infinitely variable	
2.9 Environmental conditions	
Temperature	5-35°C
Humidity	25-80%
2.10 Operating material	
Gear oil	Mobilgear 627 or a comparable gear oil about 3 litres
Toothed rod and drill column	standard plain bearing grease

2.11 Emissions

The noise emission of the drilling milling machine is 76 to 78 dB(A).

Information

This numerical value was measured on a new machine under the operating conditions specified by the manufacturer. The noise behaviour of the machine might change depending on the age and wear of the machine.

Furthermore, the noise emission also depends on production engineering factors, e.g. speed, material and clamping conditions.

Information

The specified numerical value represents the emission level and does not necessarily a safe working level.

Though there is a dependency between the degree of the noise emission and the degree of the noise disturbance it is not possible to use it reliably to determine if further precaution measures are required or not.

The following factors influence the actual degree of the noise exposure of the operator:

- Characteristics of the working area, e.g. size or damping behaviour,
- other noise sources, e.g. the number of machines,
- other processes taking place in proximity and the period of time, during which the operator is exposed to the noise.

Furthermore, it is possible that the admissible exposure level might be different from country to country due to national regulations.

This information about the noise emission should, however, allow the operator of the machine to more easily evaluate the hazards and risks.



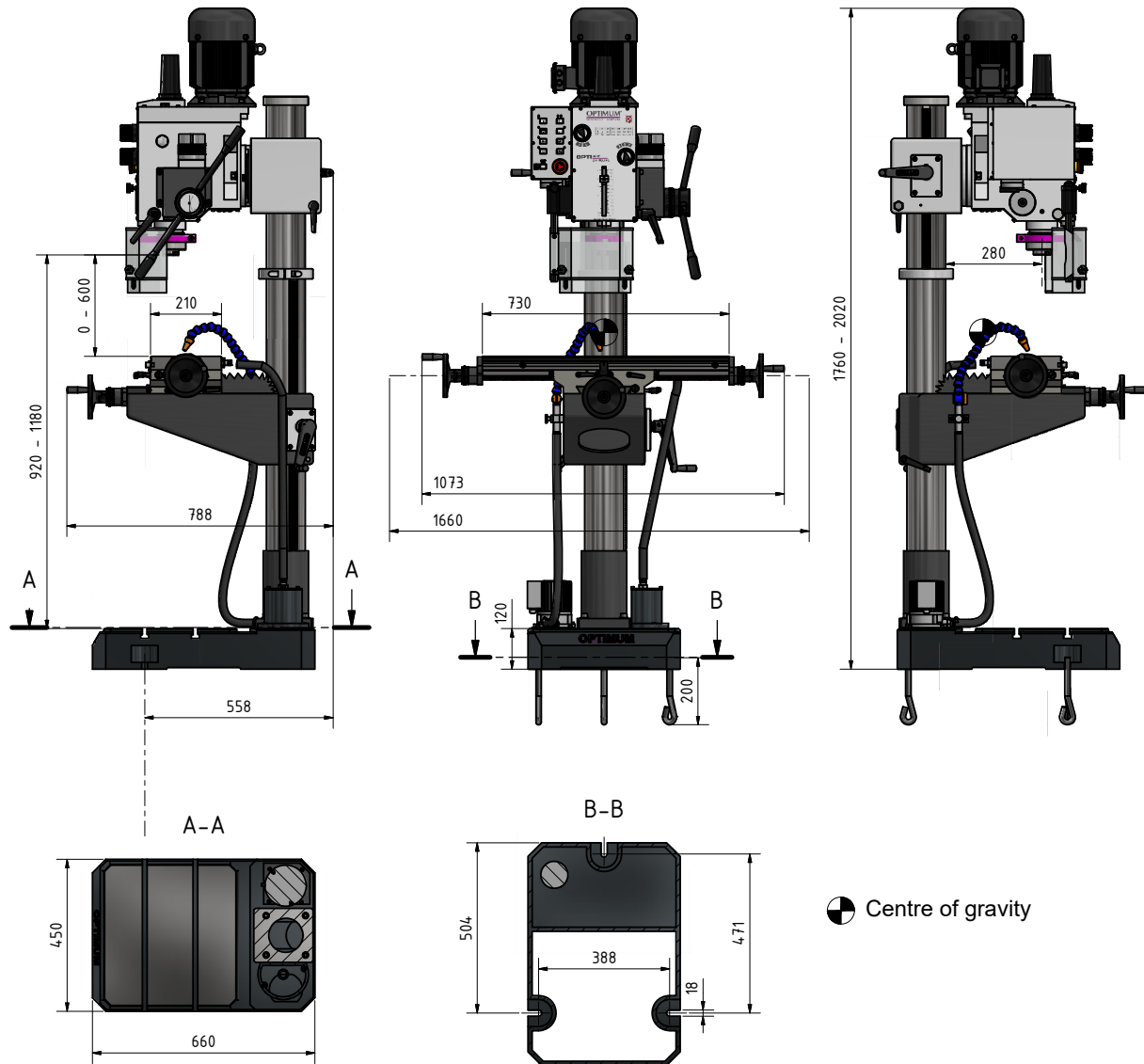
CAUTION!

Depending on the overall noise exposure and the basic threshold values, machine operators must wear appropriate hearing protection.

We generally recommend the use of noise and ear protection.



2.12 Installation plan DH 40CTPE



Img.2-1:

3 Delivery, interdepartmental transport, assembly and commissioning

3.1 Notes on transport, installation, commissioning

Improper transport, installation and commissioning is liable to accidents and can cause damage or malfunctions to the machine for which we do not assume any liability or guarantee.

Transport the scope of delivery secured against shifting or tilting with a sufficiently dimensioned industrial truck or a crane to the installation site.

WARNING!

Severe or fatal injuries may occur if parts of the machine tumble or fall down from the forklift truck or from the transport vehicle. Follow the instructions and information on the transport box.



Note the total weight of the machine. The weight of the machine is indicated in the "Technical data" of the machine. When the machine is unpacked, the weight of the machine can also be read on the rating plate.

Only use transport devices and load suspension gear that can hold the total weight of the machine.

WARNING!

The use of unstable lifting and load suspension equipment that might break under load can cause severe injuries or even death. Check that the lifting and load suspension gear has sufficient load-bearing capacity and that it is in perfect condition.



Observe the accident prevention regulations issued by your Employers Liability Insurance Association or other competent supervisory authority, responsible for your company. Fasten the loads properly.

3.1.1 General risks during internal transport

WARNING: TILTING DANGER!

The machine may be lifted unsecured by a maximum of 2 cm.

Employees must be outside the danger zone, i.e. the reach of the load.

Warn employees and advise them of the hazard.

Machines may only be transported by authorized and qualified persons. Act responsibly during transport and always consider the consequences. Refrain from daring and risky actions.

Gradients and descents (e.g. driveways, ramps and the like) are particularly dangerous. If such passages are unavoidable, special caution is required.

Before starting the transport check the transport route for possible danger points, unevenness and faults.

Danger points, unevenness and disturbance points must be inspected before transport. The removal of danger spots, disturbances and unevenness at the time of transport by other employees leads to considerable dangers.

Careful planning of interdepartmental transport is therefore essential.



3.2 Delivery

INFORMATION

The machine is pre assembled. It is delivered in a transport box. After the unpacking and the transportation to the installation site it is necessary to mount and assemble the individual components of the machine.



Check the status of the machine immediately upon receipt and claim possible damages at the last carrier also if the packing is not being damaged. In order to ensure claims towards the freight carrier we recommend you to leave the machines, devices and packing material for the time being in the status at which you have determined the damage or to take photos of this status. Please inform us about any other claims within six days after receipt of delivery.

Check if all parts are firmly seated.

3.3 Unpacking

Place the machine near its final location before proceeding to unpack. If the packaging shows signs of having possibly been damaged during transport, take the appropriate precautions to prevent the machine being damaged when unpacking. If damage is discovered, the carrier and/or shipper must be notified immediately so the necessary steps can be taken to register a complaint.

Examine the complete machine carefully and check whether all materials, such as shipping documents, instructions and accessories have been delivered with the machine.

3.4 Set-up and assembly

3.4.1 Installation site requirements

Organize the working area around the drilling milling machine according to the local safety regulations. ► Installation plan DH 40CTPE on page 19

The work area for operation, maintenance and repair must not be restrictive. ► Work area on page 18

INFORMATION

The mains plug of the drilling milling machine must be freely accessible.



3.4.2 Load suspension point

→ Fasten the load end agent on the an adequate conveyor equipment, for instance a crane.
Fix the load lifting gear around the spindle head.

→ Make sure that the attached load does not cause damage to components or paint.

3.4.3 Assembly

WARNING!

Danger of crushing and overturning. The installation of the drilling milling machine must be performed by at least 2 persons.



3.4.4 Installation

Check that the drilling milling machine foundation is horizontal with a spirit level.

Fix the foot of the drilling milling machine to the substructure with the provided through-holes.

The illumination of the workplace must be designed in such a manner that an illumination of 500 Lux is attained at the tool tip.

If this is not guaranteed with the normal installation site lighting, workplace lights must be used.

3.4.5 Fixing

In order to provide for the necessary stability of the drilling milling machine connect the machine with its foot to the substructure. We recommend the use of anchor rods DIN 529 M12 x 200

→ Fix the foot of the drilling milling machine to the substructure with the provided through-holes.

ATTENTION!

Tighten the fixing screws of the drilling milling machine only as much that it is safely fixed and cannot break away or tilt over.

If the fixing screws are too tight in particular in connection with an uneven substructure it may result in a broken stand of the machine.



3.4.6 Filling in gear oil

The drilling- milling machine is delivered without gear oil. Fill in gear oil.

3.5 First commissioning

ATTENTION!

Before commissioning the machine, all bolts, fastenings and protections must be checked and re-tightened as necessary!



WARNING!

First commissioned of the milling machine by inexperienced personnel constitute a risk to personnel and equipment.

We do not accept any liability for damages caused by incorrectly performed commissioning.



3.5.1 Warming up the machine

ATTENTION!

If the drilling milling machine and in particular the spindle is immediately operated at maximum load when it is cold it may result in damages.

If the machine is cold, e.g. directly after having transported the machine, it should be warmed up at a spindle speed of only 500 1/min for the first 30 minutes.



3.5.2 Power supply

Connect the electrical supply cable.

- CEE-400V-16A plug drilling milling machine

ATTENTION!

Ensure that all 3 phases (L1, L2, L3) are connected correctly.

Most of the defects on motors are caused by wrong connection, e.g. if the neutral conductor (N) is connected to a phase.

Effects may be as follows:

- The motor is getting hot very rapidly.



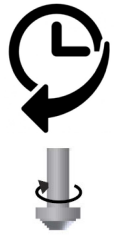
- Increased motor noises.
- The motor has no power.

The guarantee will become null and void if the machine is connected incorrectly.

ATTENTION!

Check the rotary field respectively the turning direction of the motor.

The switch position of the rotation selector switch for right-handed rotation (R) has to turn the drill spindle clockwise.



3.5.3 One-component paint

The machine is lacquered with a one-component paint. Observe this fact when selecting your cooling lubricant and cleaning of the machine.

A one-component lacquer with solvent part hardens when the solvent evaporates.

As soon as the lacquer is applied the solvent evaporates into the air. The binder becomes felted and a dry film is formed. This process is reversible, i.e. the binder can be etched again and again.

A two-component paint also consists of binding agent and solvent. However, the paint only dries when a setting agent is added. This process is not reversible, i.e. the binding agent cannot be re-softened.

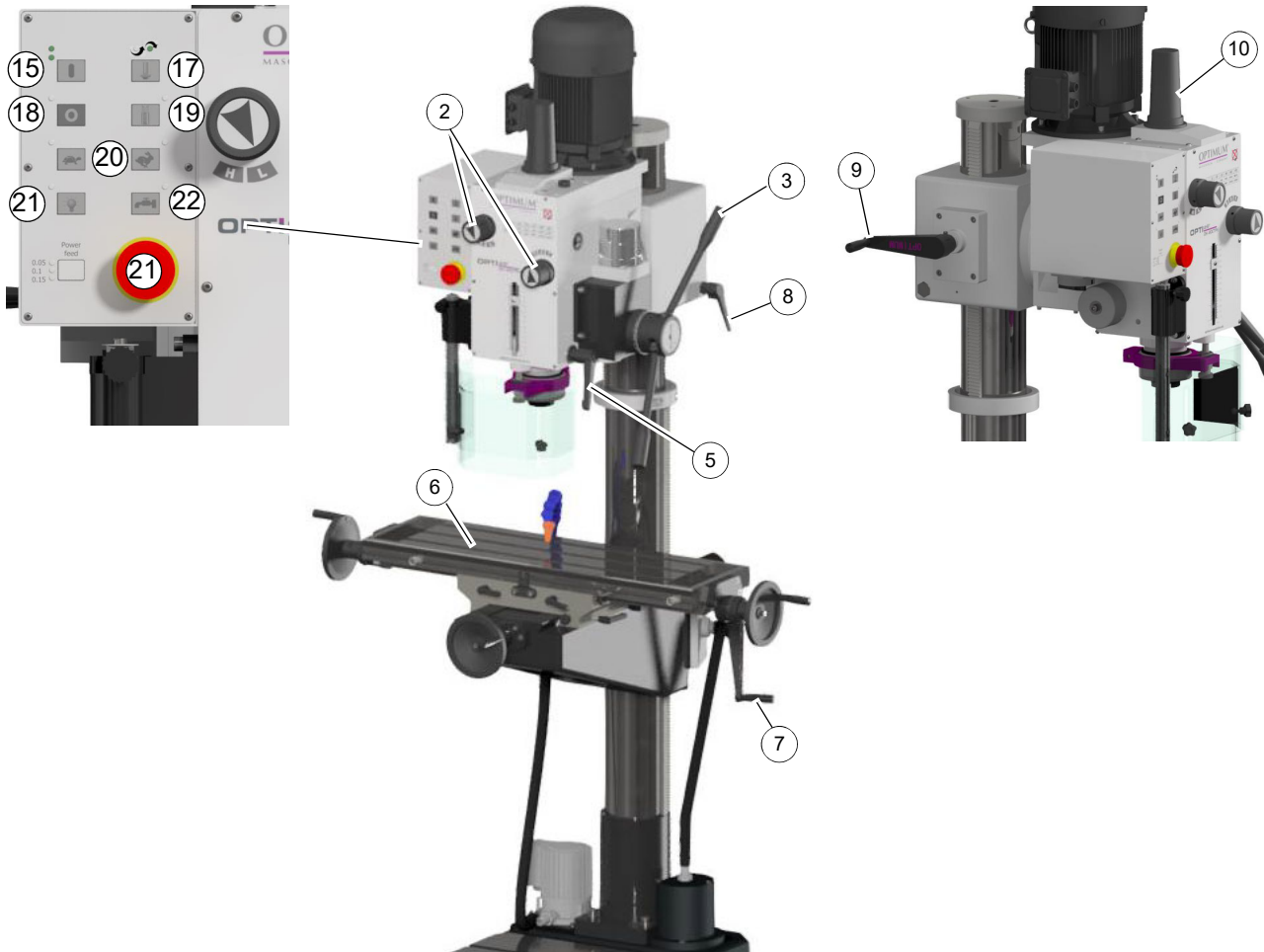
The company Optimum Maschinen Germany GmbH does not assume any guarantee for subsequent damages due to unsuitable cooling lubricants.

3.5.4 Checks

- Check the drilling milling machine as indicated under ► Safety check on page 13.
- Check the drilling milling machine as indicated under ► Oil level on page 38.

4 Operation

4.1 Control and indicating elements



Pos.	Designation	Pos.	Designation
1	Control panel	2	Speed switch
3	Quill lever	5	Spindle sleeve clamping lever
6	Cross table	7	Hand crank for table height adjustment
8	Clamping lever for height adjustment of milling head	9	Milling head height adjustment hand crank
10	Cover cap for the tightening rod	15	Spindle rotation Start
17	Spindle rotation Anti-clockwise rotation, clockwise rotation	18	Spindle rotation Stop
19	Operating mode selection: □ Thread tapping ► Thread tapping on page 29	20	Drive motor speed level - slow, fast
21	Emergency stop	22	Machine illumination On / Off
23	Coolant pump On / Off		

4.2 Safety

The drilling milling machine must only be operated under the following conditions:

- The drilling milling machine is in proper working order.
- The drilling milling machine is used as intended.
- The operating manual is followed.
- All safety devices are installed and activated.

Eliminate or have all malfunctions rectified promptly. Stop the machine immediately in the event of any abnormality in operation and make sure it cannot be started up accidentally or without authorisation.



Notify the person responsible immediately of any modification.

- For your own safety during operation on page 14

4.3 Switching on the machine

- Select the gear stage.
- Select the motor stage.
- Press the button "On"
- Press the desired spindle rotation direction.

4.4 Switching off the machine

CAUTION!

Only press the emergency stop button in a genuine emergency. You should not use the emergency-stop button to stop the machine during normal operation.



The life time of the emergency stop impact switch is not designed for operational shut-down of the machine.

Press the push button Stop. For a long-term standstill of the drilling milling machine switch it off at the master switch.

4.5 Feed for milling

with the hand cranks on the cross table.

Note the different forces acting during synchronous milling and conventional milling on the spindles of the milling table. The cutting forces during synchronous milling tend to be that the tool will move into the material.

Conventional milling is always to be preferred over synchronous milling.

Only with recirculating ball screws can the use of synchronous milling be undertaken sensibly. This instruction manual assumes that the drilling milling machine has been obtained without recirculating ball screws.

The forces and backlash occurring in the spindle nuts leads to "chatter marks" on the surface of the work piece in synchronous milling.

In conventional milling, the work piece moves with the hand cranks on the milling table opposite to the direction of rotation of the milling machine.

In synchronous milling, the work piece moves with the hand cranks on the milling table in the direction of rotation of the milling machine. A smoother surface is obtained compared with conventional milling. So, machining in synchronous milling should only be used for finishing.

4.6 Speed setting

4.6.1 Selecting the speed

The correct speed is an important factor for milling. The speed determines the cutting speed by which the cutting edges cut the material. By selecting the correct cutting speed, the service life of the tool is increased and the working result is optimized.

The optimum cutting speed mainly depends on the material and on the material of the tool. Higher speeds are possible with tools (mills) made from hard metal or cutting ceramics than with tools made from high-alloy high speed steel (HSS). You will achieve the ideal cutting speed by selecting the correct rotation speed by hand.

We recommend using a machining technology paperback

ISBN 978-3-8085-1473-3 (example, only in German language available). In these reference table books you will find all the necessary and additional information. Those machining technology paperbacks should bridge the gap between the predominantly theory-oriented textbooks and the with mostly low theoretical foundations written practice books and reference books.

4.6.2 Gear selector switch

The speed is selected by means of the gear selector switches. In conjunction with the speed levels in the control panel, you get a total of 12 speeds.

INFORMATION

Observe the speed table on the milling drilling head when selecting the range of speed.

ATTENTION!

Wait until the spindle has come to a complete halt before changing the speed with the gear selector switch.

A change of the gear ratio during operation can lead to the destruction of the gearbox.



4.7 Drill depth stop

Use the drilling depth stop when drilling several holes of the same depth.

The spindle can only be lowered to the set value.

4.8 Spindle quill feed

CAUTION!

Risk of impact from the quill levers when manual or automatic drilling feed is terminated. The return spring is tensioned and discharges the stored energy.

→ Release the clamping lever of the quill. Clamp completely tight again for milling work.

→ Use the quill lever to move the quill.

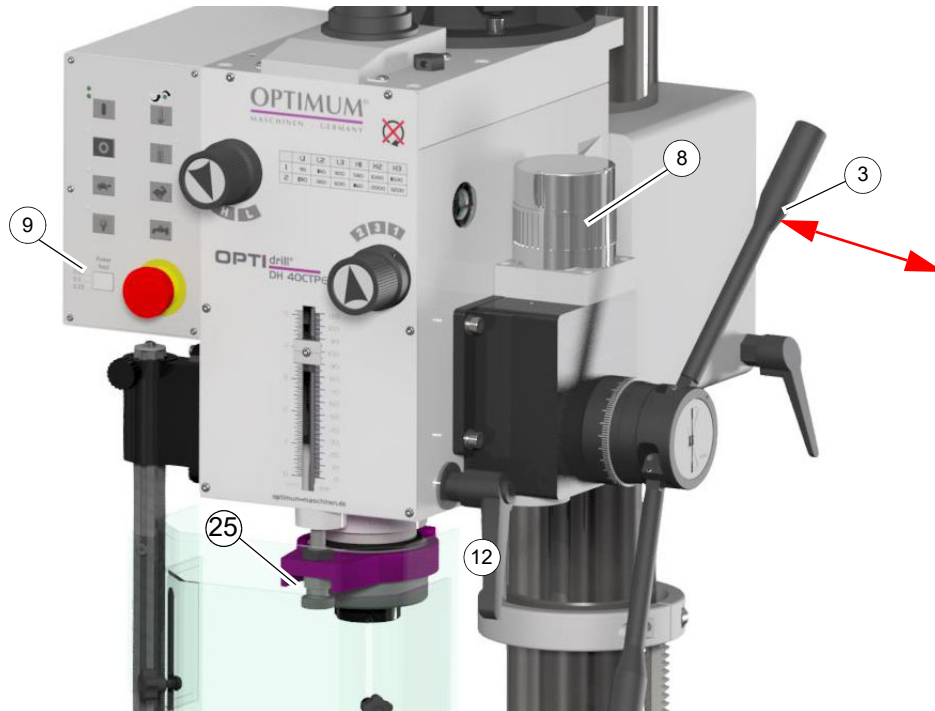


4.8.1 Automatic spindle sleeve feed

Fixed feed speed mm/rev

CAUTION!

The higher the preset speed, the faster the feed rate at the quill. Ensure that you use the correct speed for the material used and the diameter of the drill bit.



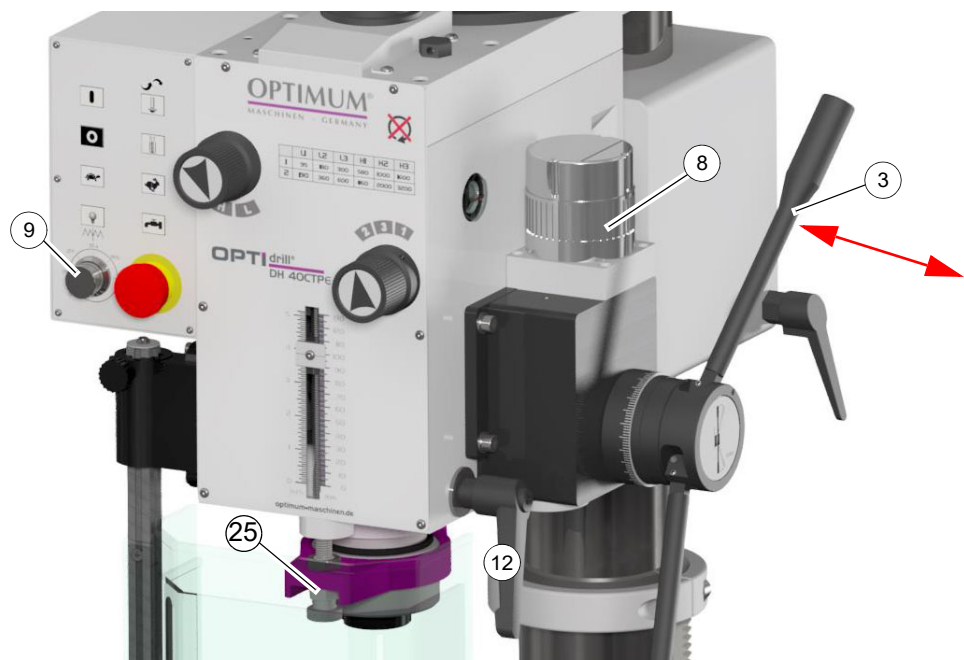
Img.4-1: DH40 CTPE

Pos.	Designation	Pos.	Designation
8	Feed motor	9	Feed rate selection 0.10 0.18 0.26 mm/rev
12	Spindle sleeve clamping lever	3	Quill lever with feed activation
25	Depth stop		

- Set the feed rate (9).
- Loosen the clamping lever (12) of the sleeve.
- Set the depth stop (25) to the desired depth.
- Switch on the spindle rotation.
- Drag the spindle sleeve lever (3) to right.

The sleeve moves downwards at the set feed speed (9) and switches off again at the set drilling depth. Optionally, push the sleeve lever back again.

Variable feed speed



Img.4-2: DH40 CTPE

Pos.	Designation	Pos.	Designation
8	Feed motor	9	Infinitely variable feed [mm/min] via Potentiometer
12	Spindle sleeve clamping lever	3	Quill lever with feed activation
25	Depth stop		

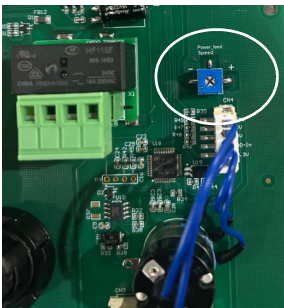
- Set the feed rate (9).
- Loosen the clamping lever (12) of the sleeve.
- Set the depth stop (25) to the desired depth.
- Switch on the spindle rotation.
- Drag the spindle sleeve lever (3) to right.

The sleeve moves downwards at the set feed speed (9) and switches off again at the set drilling depth. Optionally, push the sleeve lever back again.

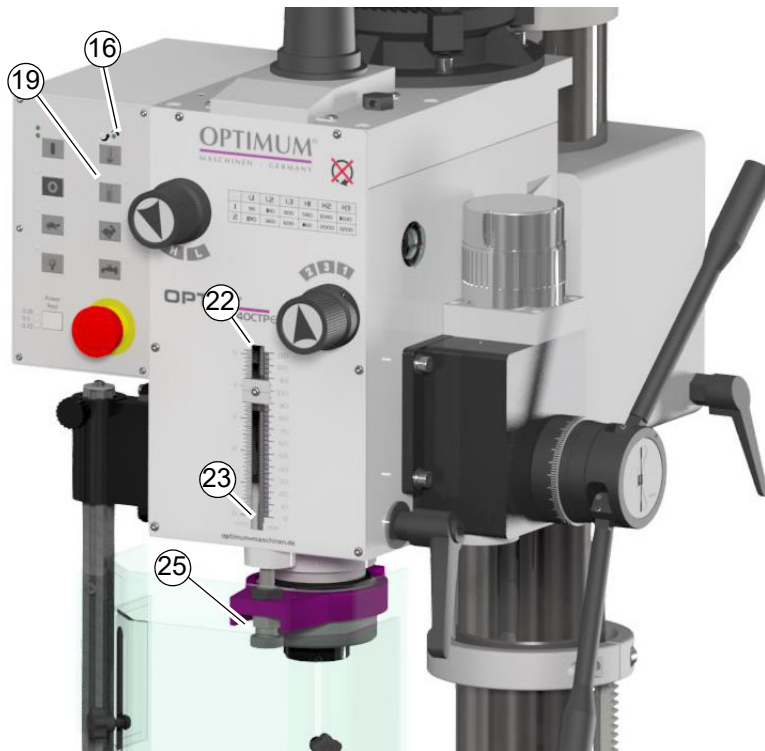
WARNING!

Dangerous voltage. Switch off the machine and secure it against being switched on again.

The percentage range of the feed speed can be increased or decreased as required at the rear of the push button control panel.



4.9 Thread tapping



Img.4-3: Thread tapping

Pos.	Designation	Pos.	Designation
22	Cycle end limit switch	19	Operating mode
23	Turning direction reversal switch	16	Direction of spindle rotation
25	Depth stop		

- Activate the operating mode (19) thread tapping.
- Set the depth stop (25) to the desired depth.
- Select the lowest speed.
- Switch on the rotation of the spindle, ensure the correct direction of rotation (16).
- Move the sleeve downward with the sleeve lever until the machine tap cams in the work piece.

The machine tap turns into the workpiece. As soon as the preset depth is attained, the spindle reverses the direction of rotation at the switch point (23). The machine tap turns out of the workpiece. When the sleeve is completely entered up to the switch point (22) the rotation of the spindle is stopped. Then it is possible to proceed another threading operation.

ATTENTION!

Before proceeding another threading cycle, the sleeve must be completely entered in order to trigger the switch point (22).



4.10 Spindle head

4.10.1 Swivelling the spindle head

The spindle head can be swung up to 45 ° to the right or left.

- Loosen three clamping screws on the spindle head. The bottom clamping screw is accessible after removing the bottom cover.
- Set the desired angle using the scale.
- Firmly tighten the clamping screws of the spindle head.

ATTENTION!

The spindle head can be swivelled significantly further. By continuing to swivel, gear oil may seep from the ventilation hole.

CAUTION!

If the screws are completely unfastened, the spindle head might fall down.

When slewing the working head, only unfasten the screws as far as necessary to be able to perform the settings. After having set the slewing angle, retighten the fixing screws.



4.10.2 Turning the spindle head

The spindle head can be turned around the axis of the drilling column.

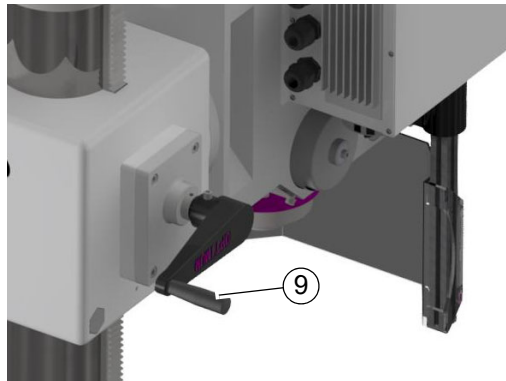
- Release the clamping lever respectively the locknut on the spindle head.
- Turn the spindle head to the desired position.
- Retighten the clamping lever respectively the locknut on the spindle head.

4.10.3 Lifting and lowering the spindle head

The spindle head can be lifted with the aid of the spindle head hand crank (9).

Position the spindle head at a higher position if you need a larger distance between the drilling sleeve and the drilling table. Possible adjustment 260mm.

- Release the clamping lever respectively the locknut on the spindle head.
- Lift or lower the spindle head using the spindle head crank handle.
- Retighten the clamping lever respectively the locknut on the spindle head.



Img.4-4: Spindle head height adjustment

4.11 Tool holder

4.11.1 Fitting the drill chuck

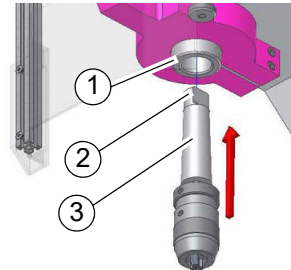
Information

To install a drill chuck, remove the tightening rod from the spindle (1) if the drill chuck cannot be fastened with the tightening rod.

The drill chuck or the tool is secured in the spindle against turning over by means of a form-locking connection (driver).

A frictionally engaged connection keeps and centres the drill chuck or the drill in the spindle.

- Check or clean the conical seat in the spindle and on the taper mandrel of the tool or of the drill chuck.
- Press the taper mandrel into the spindle.



4.11.2 Unfitting the drill chuck

The taper mandrel is detached from the spindle using the draw bar. A drill drift must be used to release the tapered connection, if drill chucks are used without internal thread for draw bars.

WARNING!

Only perform the following works if the drilling milling machine is disconnected from the electrical supply.



4.11.3 Installation of milling tools

CAUTION!

When milling, the seat cone must always be secured with the drawbar. A simple connection with the taper bore of the work spindle without using the drawbar is not permissible for milling. The cone connection is released by lateral pressure. Injuries may be caused by parts flying off.



ATTENTION!

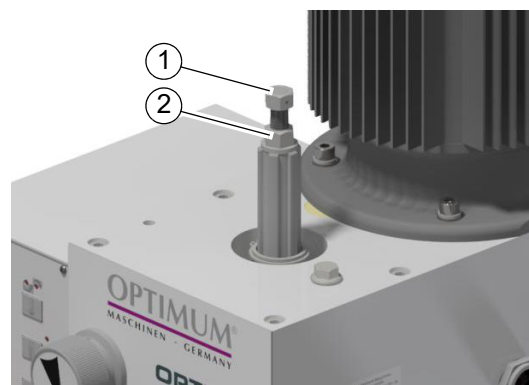
Always remove the tool again at the end of the work.

When installing a cold Morse taper in a hot machine, these MT mounts tend to shrink onto the Morse taper compared to steep taper mounts. When the machine has cooled down, or after a longer standstill, problems may arise during removal.



The milling head is fitted with an M12 tie rod.

- Remove the cover cap.
- Clean the tapered seat of the spindle and the tool.
- Insert the tool into the milling spindle / quill.
- Screw the drawbar (1) into the tool and pull it upwards with the nut (2).
- If necessary, switch to the low gear stage to reduce spinning.
- Remove the key and refit the cover cap.



Img. 4-5: Tightening rod

4.11.4 Removing milling tools

ATTENTION!

When installing a cold morse taper into a heated-up machine those MT seats tend to shrink on the morse taper contrary to the steep cone connection.

If this has happened, first let the machine warm up for a few minutes at maximum speed.

- Remove the cover cap.
- If necessary, switch to the low gear stage to reduce spinning.
- Loosen the nut (2) several turns and tap the drawbar (1) with a rubber mallet to loosen the cone connection.



4.11.5 Use of collets

If collets are used to house milling tools, higher machining tolerance can be achieved. The collet may easily and quickly be changed for a smaller or larger end mill with no need to remove the complete tool. The collet is pressed into the ring of the swivel nut and must rest there by itself. The milling cutter is clamped by fastening the swivel nut on the tool.

Make sure that the correct collet is used for each milling cutter diameter, so that the milling cutter may be fastened securely and firmly.

4.12 Cross table

4.12.1 Adjusting the height of the cross table

- Loosen the cross table by loosening the locking lever.
- Rotate the crank to lower or raise the cross table.
- Then lock the cross table by tightening the clamping lever again.

4.13 Clamping the workpieces

CAUTION!

Injuries can be caused by parts flying off.

The workpiece must always be secured to the milling table in a machine vice, chuck or with another suitable clamping tool, such as a workholding device (clamping claws).



4.13.1 Calculation of the Cutting Forces or Necessary Holding Force when Milling

The cutting force F_c arising between the tool and workpiece when milling can be calculated using the Viktor/Kienzle formula:

$$F_c = K \cdot b \cdot h^{(1-m_c)} \cdot k_{c1.1}$$

In this formula, there are 5 factors which are completely unknown without more detailed knowledge. However, these factors can be determined using tables.

The specific cutting force $k_{c1.1}$ and the chip thickness exponent m_c are dependent on the material used. Both parameters are present in tabular reference books and must be investigated for the corresponding material.

Furthermore, for the calculation of the cutting force F_c according to the Kienzle equation, the chip width b , the chip thickness h , and the correction factor K are needed.

We recommend using a book of machining technology reference tables.

In such handbooks you will find all the necessary and additional information. Such manuals should bridge the gap between the predominantly theory-oriented textbooks and reference and table books mostly written with the few theoretical principles in practice.

4.14 Coolant equipment

→ Adjust the flow using the dosing tap. The dosing tap is not suitable as a stopcock.

ATTENTION!

Destruction of the pump due dry running.

The pump is lubricated by the cooling agent. Do not operate the pump without coolant. Clean the collection container of the chip filter in regular intervals.



WARNING!

Spurting and overrun of coolants and lubricants. Ensure that cooling lubricants are not discharged onto the floor. Any cooling lubricants that run onto the floor must be removed immediately.

Regularly clean the coolant tank.



CAUTION!

The cooling lubricant needs to be checked at least weekly, including during downtimes, with regard to its concentration, ph-value, bacteria and fungal decay.

- Cooling lubricants and tanks on page 43
- Inspection plan for water-mixed cooling lubricants on page 44

Please note the VKIS - VSI - IGM substance list for coolant lubricants as per DIN 51385 for metal working.



5 Determining the cutting speed and the speed

5.1 Table cutting speeds / infeed

Material table						
Material to be processed	Recommended cutting speed Vc in m/min	Recommended infeed f in mm/revolution				
		Drill bit diameter d in mm				
		2...3	>3...6	>6...12	>12...25	>25...50
Unalloyed construction steels < 700 N/mm²	30 - 35	0.05	0.10	0.15	0.25	0.35
Alloyed construction steels > 700 N/mm²	20 - 25	0.04	0.08	0.10	0.15	0.20
Alloyed steels < 1000 N/mm²	20 - 25	0.04	0.08	0.10	0.15	0.20
Steels, low stability < 800 N/mm²	40	0.05	0.10	0.15	0.25	0.35
Steel, high stability > 800 N/mm²	20	0.04	0.08	0.10	0.15	0.20
non-rust steels > 800 N/mm²	12	0.03	0.06	0.08	0.12	0.18
Cast iron < 250 N/mm²	15 - 25	0.10	0.20	0.30	0.40	0.60
Cast iron > 250 N/mm²	10 - 20	0.05	0.15	0.25	0.35	0.55
CuZn alloy brittle	60 - 100	0.10	0.15	0.30	0.40	0.60
CuZn alloy ductile	35 - 60	0.05	0.10	0.25	0.35	0.55
Aluminium alloy up to 11% Si	30 - 50	0.10	0.20	0.30	0.40	0.60
Thermoplastics	20 - 40	0.05	0.10	0.20	0.30	0.40
Thermosetting materials with organic filling	15 - 35	0.05	0.10	0.20	0.30	0.40
Thermosetting materials with an-organic filling	15 - 25	0.05	0.10	0.20	0.30	0.40

5.2 Speed table

Vc in m/min	4	6	8	10	12	15	18	20	25	30	35	40	50	60	80	100
Drill bit Ø in mm	Speed n in rpm															
1,0	1274	1911	2548	3185	3822	4777	5732	6369	7962	9554	11146	12739	15924	19108	25478	31847
1,5	849	1274	1699	2123	2548	3185	3822	4246	5308	6369	7431	8493	10616	12739	16985	21231
2,0	637	955	1274	1592	1911	2389	2866	3185	3981	4777	5573	6369	7962	9554	12739	15924
2,5	510	764	1019	1274	1529	1911	2293	2548	3185	3822	4459	5096	6369	7643	10191	12739
3,0	425	637	849	1062	1274	1592	1911	2123	2654	3185	3715	4246	5308	6369	8493	10616
3,5	364	546	728	910	1092	1365	1638	1820	2275	2730	3185	3640	4550	5460	7279	9099
4,0	318	478	637	796	955	1194	1433	1592	1990	2389	2787	3185	3981	4777	6369	7962
Vc in m/min	4	6	8	10	12	15	18	20	25	30	35	40	50	60	80	100

D mm Vc m/min

Drilling_VC_GB.fm	Drill bit Ø in mm	Speed n in rpm															
	4,5	283	425	566	708	849	1062	1274	1415	1769	2123	2477	2831	3539	4246	5662	7077
	5,0	255	382	510	637	764	955	1146	1274	1592	1911	2229	2548	3185	3822	5096	6369
	5,5	232	347	463	579	695	869	1042	1158	1448	1737	2027	2316	2895	3474	4632	5790
	6,0	212	318	425	531	637	796	955	1062	1327	1592	1858	2123	2654	3185	4246	5308
	6,5	196	294	392	490	588	735	882	980	1225	1470	1715	1960	2450	2940	3920	4900
	7,0	182	273	364	455	546	682	819	910	1137	1365	1592	1820	2275	2730	3640	4550
	7,5	170	255	340	425	510	637	764	849	1062	1274	1486	1699	2123	2548	3397	4246
	8,0	159	239	318	398	478	597	717	796	995	1194	1393	1592	1990	2389	3185	3981
	8,5	150	225	300	375	450	562	674	749	937	1124	1311	1499	1873	2248	2997	3747
	9,0	142	212	283	354	425	531	637	708	885	1062	1238	1415	1769	2123	2831	3539
	9,5	134	201	268	335	402	503	603	670	838	1006	1173	1341	1676	2011	2682	3352
	10,0	127	191	255	318	382	478	573	637	796	955	1115	1274	1592	1911	2548	3185
	11,0	116	174	232	290	347	434	521	579	724	869	1013	1158	1448	1737	2316	2895
	12,0	106	159	212	265	318	398	478	531	663	796	929	1062	1327	1592	2123	2654
	13,0	98	147	196	245	294	367	441	490	612	735	857	980	1225	1470	1960	2450
	14,0	91	136	182	227	273	341	409	455	569	682	796	910	1137	1365	1820	2275
	15,0	85	127	170	212	255	318	382	425	531	637	743	849	1062	1274	1699	2123
	16,0	80	119	159	199	239	299	358	398	498	597	697	796	995	1194	1592	1990
	17,0	75	112	150	187	225	281	337	375	468	562	656	749	937	1124	1499	1873
	18,0	71	106	142	177	212	265	318	354	442	531	619	708	885	1062	1415	1769
	19,0	67	101	134	168	201	251	302	335	419	503	587	670	838	1006	1341	1676
	20,0	64	96	127	159	191	239	287	318	398	478	557	637	796	955	1274	1592
	21,0	61	91	121	152	182	227	273	303	379	455	531	607	758	910	1213	1517
	22,0	58	87	116	145	174	217	261	290	362	434	507	579	724	869	1158	1448
	23,0	55	83	111	138	166	208	249	277	346	415	485	554	692	831	1108	1385
	24,0	53	80	106	133	159	199	239	265	332	398	464	531	663	796	1062	1327
	25,0	51	76	102	127	153	191	229	255	318	382	446	510	637	764	1019	1274
	26,0	49	73	98	122	147	184	220	245	306	367	429	490	612	735	980	1225
	27,0	47	71	94	118	142	177	212	236	295	354	413	472	590	708	944	1180
	28,0	45	68	91	114	136	171	205	227	284	341	398	455	569	682	910	1137
	29,0	44	66	88	110	132	165	198	220	275	329	384	439	549	659	879	1098
	30,0	42	64	85	106	127	159	191	212	265	318	372	425	531	637	849	1062
	31,0	41	62	82	103	123	154	185	205	257	308	360	411	514	616	822	1027
	32,0	40	60	80	100	119	149	179	199	249	299	348	398	498	597	796	995
	33,0	39	58	77	97	116	145	174	193	241	290	338	386	483	579	772	965
	34,0	37	56	75	94	112	141	169	187	234	281	328	375	468	562	749	937
	35,0	36	55	73	91	109	136	164	182	227	273	318	364	455	546	728	910
	36,0	35	53	71	88	106	133	159	177	221	265	310	354	442	531	708	885
	37,0	34	52	69	86	103	129	155	172	215	258	301	344	430	516	689	861
	38,0	34	50	67	84	101	126	151	168	210	251	293	335	419	503	670	838
	Vc in m/min	4	6	8	10	12	15	18	20	25	30	35	40	50	60	80	100

Drill bit Ø in mm	Speed n in rpm															
39,0	33	49	65	82	98	122	147	163	204	245	286	327	408	490	653	817
40,0	32	48	64	80	96	119	143	159	199	239	279	318	398	478	637	796
41,0	31	47	62	78	93	117	140	155	194	233	272	311	388	466	621	777
42,0	30	45	61	76	91	114	136	152	190	227	265	303	379	455	607	758
43,0	30	44	59	74	89	111	133	148	185	222	259	296	370	444	593	741
44,0	29	43	58	72	87	109	130	145	181	217	253	290	362	434	579	724
45,0	28	42	57	71	85	106	127	142	177	212	248	283	354	425	566	708
46,0	28	42	55	69	83	104	125	138	173	208	242	277	346	415	554	692
47,0	27	41	54	68	81	102	122	136	169	203	237	271	339	407	542	678
48,0	27	40	53	66	80	100	119	133	166	199	232	265	332	398	531	663
49,0	26	39	52	65	78	97	117	130	162	195	227	260	325	390	520	650
50,0	25	38	51	64	76	96	115	127	159	191	223	255	318	382	510	637

5.2.1 Example for calculating the required speed on your drilling machine

The necessary speed is depending on the diameter of the drill bit, on the material which is being machined as well as on the cutting material of the drill bit.

Material which needs to be drilled: St37

Cutting material (drill bit): HSS spiral bit

Set point of the cutting speed [V_c] according to the table: 40 meters per minute

Diameter [d] of your drill bit: 30 mm = 0.03 m [meters]

Selected infeed [f] according to the table: about 0.35 mm/rev

$$\text{Speed } n = \frac{V_c}{\pi \times d} = \frac{40 \text{ m}}{\text{min} \times 3.14 \times 0.03 \text{ m}} = 425 \text{ rpm}$$

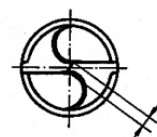
Set a speed on your drilling machine which is less than the determined speed.

INFORMATION

In order to facilitate the production of larger drill holes they need to be pre-drilled. This way, you reduce the cutting forces and improve the guiding of the drill bit.

The pre-drilling diameter is depending on the length of the chisel edge. The chisel edge does not cut, but it squeezes the material. The chisel edge is positioned at an angle of 55° to the major cutting edge.

As a general rule of thumb it applies: The pre-drilling diameter is depending on the length of the chisel edge.



Chisel edge length 10% of the drill bit - Ø



Recommended working steps for a drilling diameter of 30 mm

Example:

1st working step: Pre-drilling with Ø 5 mm.

2nd working step: Pre-drilling with Ø 15 mm.

3rd working step: Drilling with Ø 30 mm.

6 Maintenance

In this chapter you will find important information about

- Inspection
- Maintenance
- Repair

of the drilling and milling machine

ATTENTION!

Properly performed regular maintenance is an essential prerequisite for

- operational safety,
- failure-free operation,
- a long working life of the drilling and milling machine and
- the quality of the products which you manufacture.



Installations and equipment from other manufacturers must also be in good order and condition.

ENVIRONMENTAL PROTECTION

During work on the spindle head, please make sure that

- collecting containers with sufficient capacity for the amount of liquid to be collected are used.
- Liquids and oils should not be split on the ground.



Clean up any spilt liquid or oils immediately using proper oil-absorption methods and dispose of them in accordance with current environmental protection regulations.

Collect leakages

Do not re-introduce liquids spilt outside the system during repair or as a result of leakage from the reserve tank; collect them in a collecting container for disposal.

Disposal

Never dump oil or other environmentally hazardous substances which are harmful to the environment in water inlets, rivers or channels.

Used oils must be delivered to a collection centre. Please consult your supervisor for further information on your nearest collection point.

6.1 Safety

WARNING!

The consequences of incorrect maintenance and repair work may include:

- extremely serious injuries to those working on the drilling and milling machine and
- damage to the drilling and milling machine.



Maintenance and repair work on the drilling and milling machine must be carried out by qualified technical personnel only.

6.1.1 Preparation

WARNING!

Only work on the drilling milling machine if it has been disconnected from the power supply. ► Switching-off and securing the drilling- milling machine on page 15

Attach a warning label.



6.1.2 Restarting

Before restarting, run a safety check.

- Safety check on page 13

WARNING!

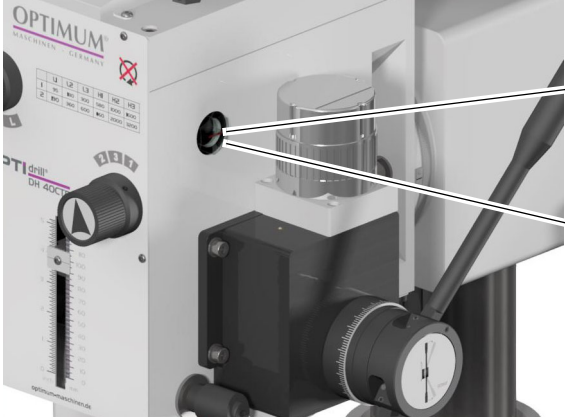
Before starting the drilling milling machine you must be sure that

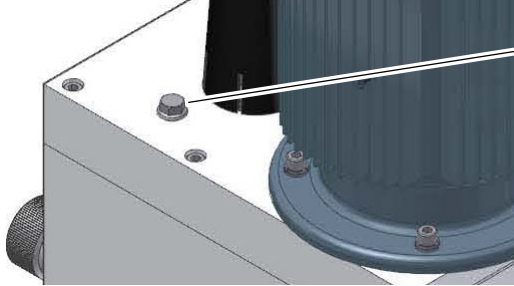
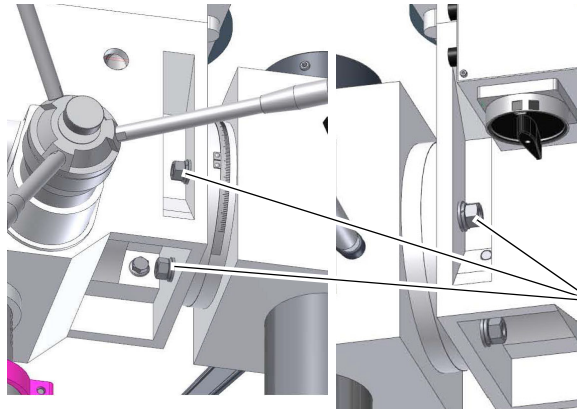
- lead to any danger with respect to people,
- the drilling milling machine is not damaged.



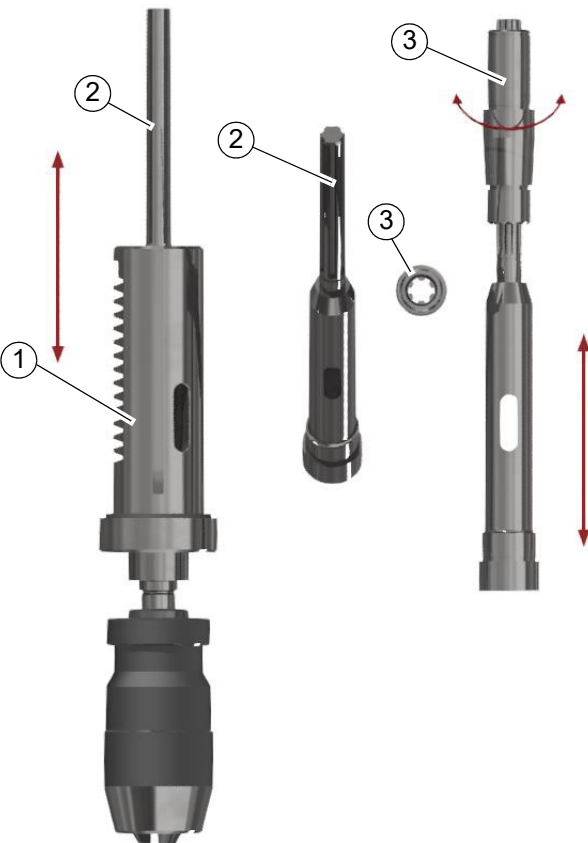
6.2 Inspection and maintenance

The type and level of wear depends to a large extent on the individual usage and operating conditions. Any indicated intervals therefore are only valid for the corresponding approved conditions.

Interval	Where?	What?	How?
Start of shift after every maintenance or repair work	Drilling and milling machine	► Safety check on page 13	
Start of shift after every maintenance or repair work	Spindle head	Oil level	→ Check if the oil level can be seen in the oil sight glass. The sight glass should be half-covered.  Img.6-1: Oil sight glass

Interval	Where?	What?	How?
the first time after 20 hours of operation, then annually	Spindle head	Oil change	→ Use an appropriate collecting vessel with a capacity of at least 3 liters when performing the oil change. → Unscrew the oil filling screw. → Swivel the drilling head in order to allow the oil to drain of. ► Swivelling the spindle head on page 30  Oil filling screw/Aeration screw Img. 6-2: Oil filling screw → Refill the spindle head after having drained the oil. Pay attention to the correct level. ► Operating material on page 18
Every month	Spindle head clamping screws	firmly tightened	→ Ensure that the clamping screws for swivelling the spindle head are firmly tightened.  Clamping screw right Img. 6-3: Clamping screw to slew the drilling head
Every month	Drill column and Toothed rod	Oiling	→ Lubricate the drill column regularly with commercial oil. → Lubricate the toothed rod regularly with commercial grease (e.g. friction bearing grease).
Every month	Oiler cup	Oiling	→ Lubricate all oiler cups with machine oil, do not use grease guns or the like. ► Operating material on page 18

Interval	Where?	What?	How?
Monthly, for machines with coolant device only	Chip filter	Cleaning	The chip filter prevents the reflux of chips in the coolant tank. Clean the chip filter regularly. Impurities in the cooling lubricant cause blockages and reducing the life of the cooling lubricant pump. Replace the cooling agent regularly, depending on usage. ► Inspection plan for water-mixed cooling lubricants on page 44 → To do so, unscrew the chip filter and remove the chips or other soiling. → Empty and clean the collecting tray.  Img.6-4: Chip filter

Interval	Where?	What?	How?
in case of need	Toothing of the spindle	Lubrication	Any unusual rattling noises can be eliminated by regreasing. The sleeve (1) moves downwards or upwards with the toothed spindle (2) in the fixed driven sleeve (3) during drill feed. The noises are caused by the necessary clearance between the two toothings of the sleeve and spindle. The grease in the delivery condition may have been used up.  Img. 6-5: Regreasing is carried out from above via the spindle drive. Apply grease at the visible toothed area of the spindle. It is recommended to use a grease which can remain permanently inside the toothing. The grease "Staburag NBU 30 PTM" from Klüber is recommended and has proved to be a successful assembly grease for clearance fits.
	Electronics	Testing	Check the electrical equipment / parts of the drilling milling machine. ► Inspection deadlines on page 16

INFORMATION

The feed gearbox with motorised drive is permanently lubricated. Regular lubrication is not required.



6.3 Repair

6.3.1 Customer service technician

For any repair work request the assistance of an authorised customer service technician. Contact your specialist dealer if you do not have customer service's information or contact Stürmer Maschinen GmbH in Germany who can provide you with a specialist dealer's contact information. Optionally, the company Stürmer Maschinen GmbH

Dr.-Robert-Pfleger-Str. 26

D- 96103 Hallstadt

can provide a customer service technician, however, the request for a customer service technician can only be made via your specialist dealer.

If the repairs are carried out by qualified technical personnel, they must follow the indications given in these operating instructions.

Optimum Maschinen Germany GmbH accepts no liability nor does it guarantee against damage and operating malfunctions resulting from failure to observe these operating instructions.

For repairs, only use

- ☐ faultless and suitable tools only,
- ☐ original parts or parts from series expressly authorised by Optimum Maschinen Germany GmbH.

6.4 Cooling lubricants and tanks

CAUTION!

The cooling lubricant can cause diseases. Avoid direct contact with cooling lubricant or parts covered in cooling lubricant.



Cooling lubricant circuits and tanks for water-cooling lubricant mixtures must be completely emptied, cleaned and disinfected as needed, but at least once per year or every time the cooling lubricant is replaced.

If fine chips and other foreign matters are accumulated in the coolant tank, the machine can no longer be correctly supplied with coolant. Furthermore, the lifetime of the coolant pump is reduced.

When processing cast iron or similar materials generating fine chips, cleaning the coolant tank more often is recommended.

Limit values

The cooling lubricant must be replaced, the cooling lubricant circuit and tank emptied, cleaned and disinfected if

- the pH value drops by more than 1 based on the value during initial filling. The maximum permissible pH value during initial filling is 9.3
- there is a perceivable change in the appearance, odour, floating oil or increase of the bacteria to more than 10/6/ml
- there is an increase in nitrite content to more than 20 ppm (mg/l) or nitrate content to more than 50 ppm (mg/l)
- there is an increase in the N-nitrosodiethanolamine (NDELA) to more than 5 ppm (mg/a)

CAUTION!

Comply with the manufacturer's specifications for mixture ratios, hazardous substances, e.g. system cleaners, including their permissible minimum use times.



CAUTION!

Since the cooling lubricant escapes under high pressure, pumping out the coolant by using the existing cooling lubricant pump via a pressure hose into a suitable tank is not recommended.



ENVIRONMENTAL PROTECTION

During work on the cooling lubricant equipment please make sure that

- collector tanks are used with sufficient capacity for the amount of liquid to be collected.
- liquids and oils should not be spilled on the ground.



Clean up any spilled liquid or oils immediately using proper oil-absorption methods and dispose of them in accordance with current statutory environmental regulations.

Collect leakages

Do not re-introduce liquids spilled outside the system during repair or as a result of leakage from the reserve tank, instead collect them in a collecting container for disposal.

Disposal

Never dump oil or other substances which are harmful to the environment into water inlets, rivers or channels. Used oils must be delivered to a collection centre. Consult your supervisor if you do not know where the collection centre is.

6.4.1 Inspection plan for water-mixed cooling lubricants

Company: No.: Date: used cooling lubricant			
size to be checked	Inspection methods	Inspection intervals	Procedure and comment
noticeable changes	Appearance, odour	daily	Find and rectify causes, e.g. skim off oil, check filter, ventilate cooling lubricant system
pH value	Laboratory techniques electrometric with pH meter (DIN 51369) Local measurement method: with pH paper (Special indicators with suitable measuring range)	weekly ¹⁾	if pH value decreases > 0.5 based on initial filing: Measures in accordance manufacturer's recommendations > 1.0 based on initial filing: Replace cooling lubricant, clean cooling lubricant circulation system
Usage concentration	Manual refractometer	weekly ¹⁾	Method results in incorrect values with tramp oil content
Base reserve	Acid titration in accordance with Manufacturer's recommendation	as required	Method is independent of tramp oil content
Nitrite content	Test sticks method or laboratory method	weekly ¹⁾	> 20 mg/L nitrite: Replace cooling lubricant or part or inhibiting additives; otherwise NDELA (N-nitrosodiethanolamine) in the cooling lubricant system and in the air must be determined > 5 mg/L NDELA in the cooling lubricant system: Replacement, clean and disinfect cooling lubricant circulation system, find nitrite source and, if possible, rectify.
Nitrate/nitrite content of the preparation water, if this is not removed from the public grid	Test sticks method or laboratory method	as required	Use water from the public grid if there is water from the public grid has > 50 mg/l nitrate: Inform the waterworks

¹⁾ The specified inspection intervals (frequency) are based on continuous operation. Other operational conditions can result in other inspection intervals; exceptions are possible in accordance with Sections 4.4 and 4.10 of the TGS 611.

Editor:

Signature:

7 Ersatzteile - Spare parts

7.1 Ersatzteilbestellung - Ordering spare parts

Bitte geben Sie folgendes an - *Please indicate the following :*

- Seriennummer - *Serial No.*
- Maschinenbezeichnung - *Machines name*
- Herstellungsdatum - *Date of manufacture*
- Artikelnummer - *Article no.*

Die Artikelnummer befindet sich in der Ersatzteilliste. *The article no. is located in the spare parts list.* Die Seriennummer befindet sich am Typschild. *The serial no. is on the rating plate.*

7.2 Hotline Ersatzteile - Spare parts Hotline



+49 (0) 951-96555 -118
ersatzteile@stuermer-maschinen.de



7.3 Service Hotline

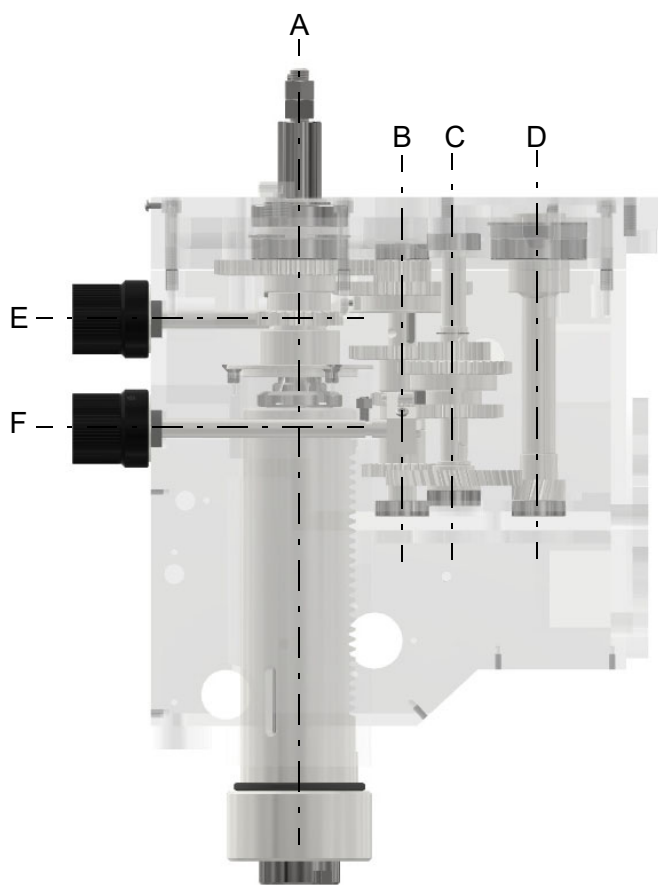


+49 (0) 951-96555 -100
service@stuermer-maschinen.de

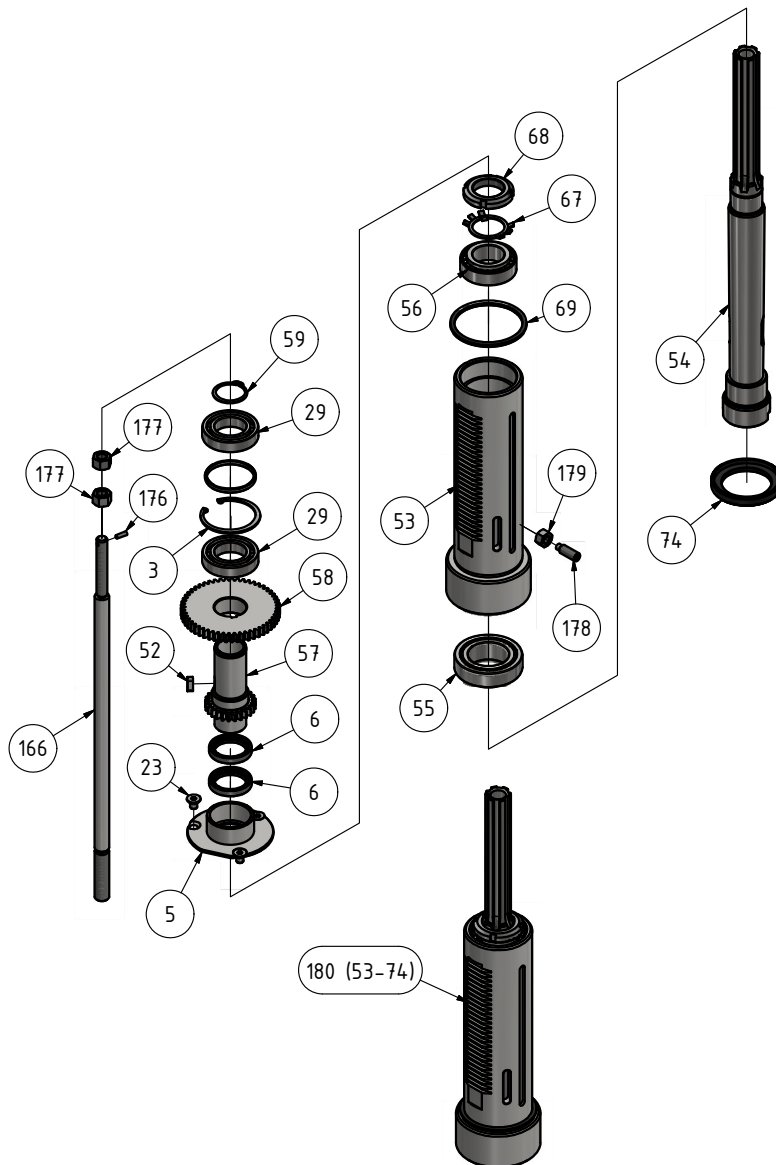


7.4 Ersatzteilzeichnungen - Spare part drawings

7.4.1 Übersicht Fräskopf - Milling head overview



A - Welle A - Shaft A

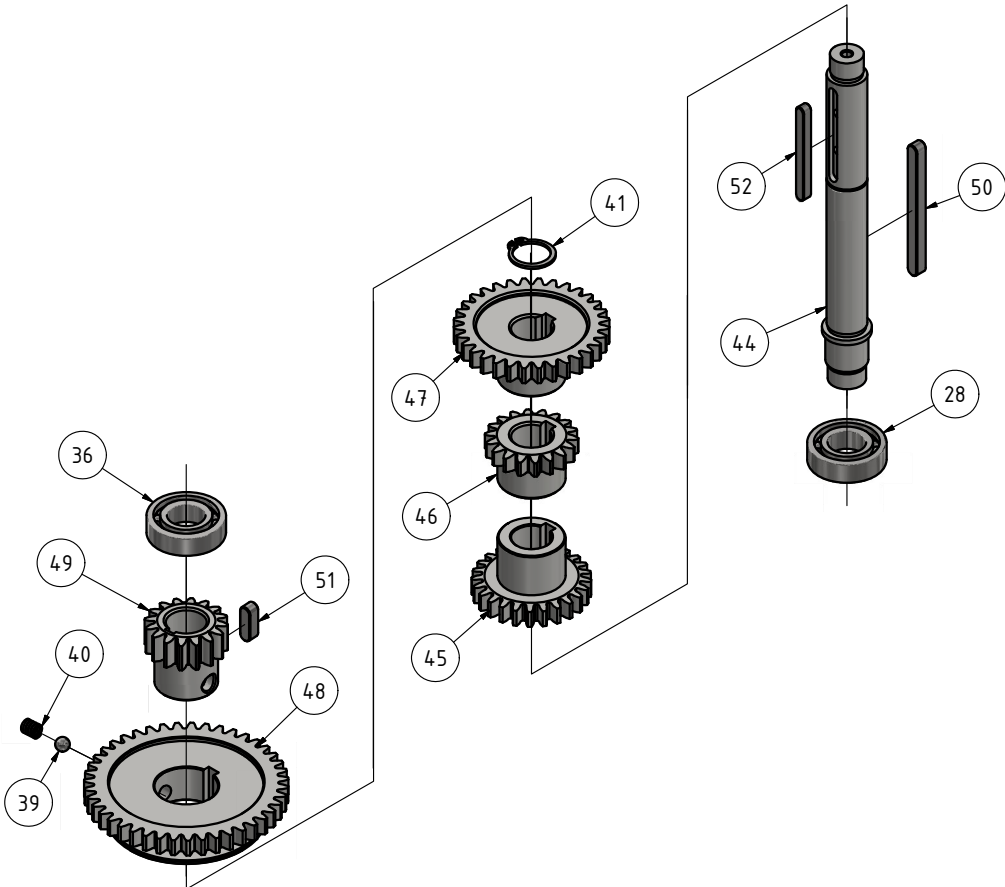


Welle A - Shaft A					
Pos.	Bezeichnung	Description	Menge Qty.	Grösse Size	Artikelnummer Item no.
3	Sicherungsring	Retaining ring	1	DIN 472 - 63 x2	0303434903
5	Flansch	Flange	1		0303434905
6	Wellendichtring	Shaft seal	2	35 x 45 x 8 - NBR	0303434906
23	Innensechskant Senkkopfschraube	Hexagon socket countersunk head screw	3	M8 x 12	
29	Rillenkugellager	Deep groove ball bearing	2	6007	0406007
52	Passfeder	Feather key	1	DIN 6885 - A6 x 6 x 18	0303434952
54	Spindel	Spindle	1	MT4	0303434954
55	Kegelrollenlager	Tapered roller bearing	1	33009	04033009
56	Kegelrollenlager	Tapered roller bearing	1	33007	04033007
57	Zahnradwelle	Gear shaft	1		0303434957
58	Zahnrad	Gear	1		0303434958
59	Sicherungsring	Retaining ring	1	DIN 471 - 34 x 1.5	0303434959
67	Sicherungsscheibe	Lock washer	1	GB/T 858-1988 35 x 43	0303434967
68	Nutmutter	Locknut	1	GB/T 812-1988 M36x1,5	0303434968
69	O-Ring	O-ring	1	75x5,3 NBR70	0303434969
74	Wellendichtring	Shaft seal	1	76 x 52 NBR	0303434974
166	Anzugsstange	Tightening rod	1	M12	03034349166

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Welle A - Shaft A					
Pos.	Bezeichnung	Description	Menge	Grösse	Artikelnummer
			Qty.	Size	
176	Stift	Pin	1	4x14	
177	Mutter	Nut	2	M12	
178	Gewindestift mit Innensechskant und Zapfen	Hexagon socket set screw with dog point	1	DIN 915 - M10 x 30	
179	Mutter	Nut	1	M10	
180	Pinole komplett	Spindle sleeve complete		MT4	03034349CPL

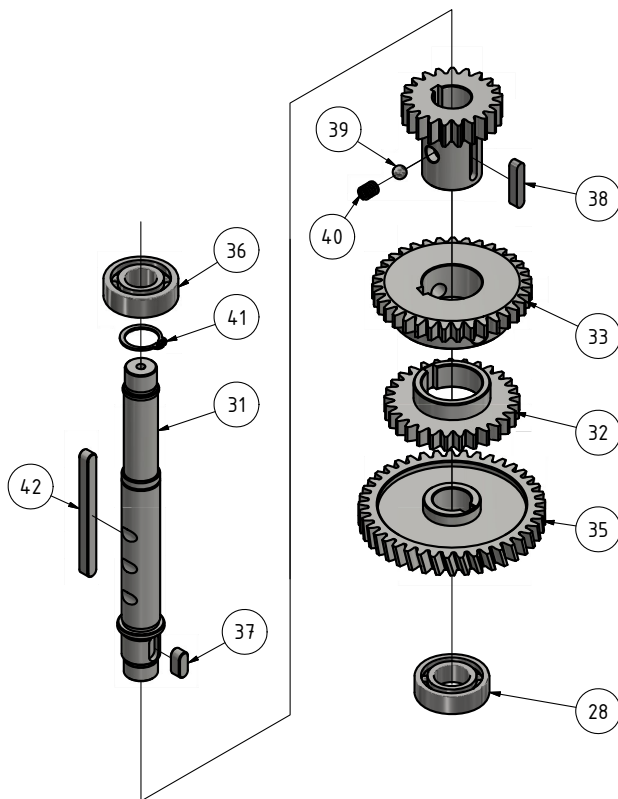
B - Welle B - Shaft B



Welle B - Shaft B					
Pos.	Bezeichnung	Description	Menge	Grösse	Artikelnummer
			Qty.	Size	
28	Rillenkugellager	Deep groove ball bearing	2	6003	0406003
36					
39	Stahlkugel	Steel ball	1		0303434939
40	Feder	Spring	1		0303434940
41	Sicherungsring	Retaining ring	1	DIN 471 - 18x1,2	0303434941
44	Welle	Shaft	1		0303434944
45	Zahnradwelle	Shaft gear	1		0303434945
46	Zahnradwelle	Shaft gear	1		0303434946
47	Zahnrad	Gear	1		0303434947
48	Zahnrad	Gear	1		0303434948
49	Zahnradwelle	Shaft gear	1		0303434949
50	Passfeder	Feather key	1		0303434950
51	Passfeder	Feather key	1		0303434951
52	Passfeder	Feather key	1		0303434952

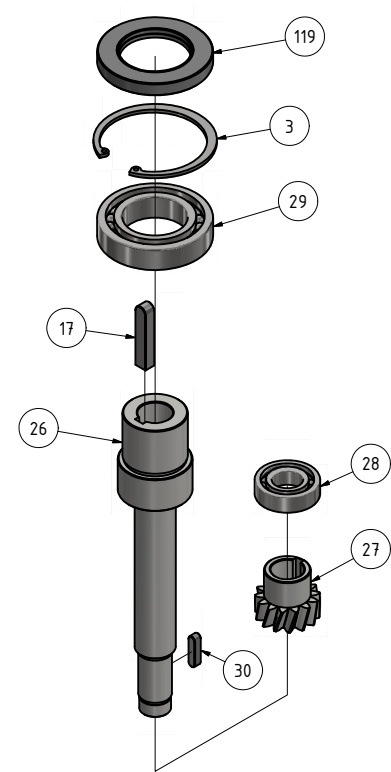
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C - Welle C - Shaft C



Welle C - Shaft C					
Pos.	Bezeichnung	Description	Menge Qty.	Grösse Size	Artikelnummer Item no.
28	Rillenkugellager	Deep groove ball bearing	1	6003	0406003
31	Welle	Shaft	1		0303434931
32	Zahnrad	Gear	1		0303434932
33	Zahnrad	Gear	1		0303434933
35	Zahnrad	Gear	1		0303434935
36	Rillenkugellager	Deep groove ball bearing	1	6202	0406202
37	Passfeder	Feather key	1	6x14	0303434937
38	Passfeder	Feather key	1	5 x 5 x 25	0303434938
39	Stahlkugel	Steel ball	1		0303434939
40	Feder	Spring	1		0303434940
41	Sicherungsring	Retaining ring	1	DIN 471 - 17x1	0303434941
42	Passfeder	Feather key	1	6x70	0303434942
49	Zahnrad	Gear	1		0303434949

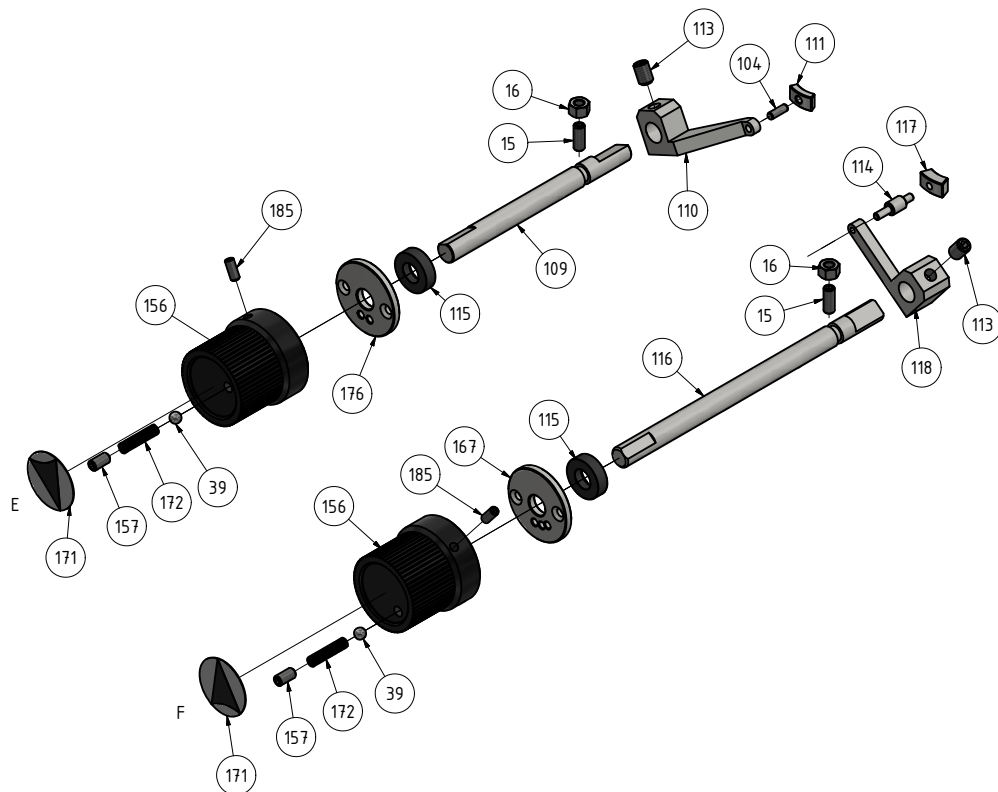
D - Welle D - Shaft D



Welle D - Shaft D					
Pos.	Bezeichnung	Description	Menge	Grösse	Artikelnummer
			Qty.	Size	Item no.
3	Sicherungsring	Retaining ring	1	DIN 472 - 63 x 2	0303434903
17	Passfeder	Feather key	1	GB/T 1096 - C 8 x 7 x 40	0303434917
26	Motor Zahnradwelle	Motor gear shaft	1		0303434926
27	Zahnrad	Gear	1		0303434927
28	Rillenkugellager	Deep groove ball bearing	1	6003	0406003
29	Rillenkugellager	Deep groove ball bearing	1	6007	0406007
30	Passfeder	Feather key	1	GB/T 1096 - A 5 x 5 x 20	0303434930
119	Wellendichtring	Shaft seal	1		03034349119

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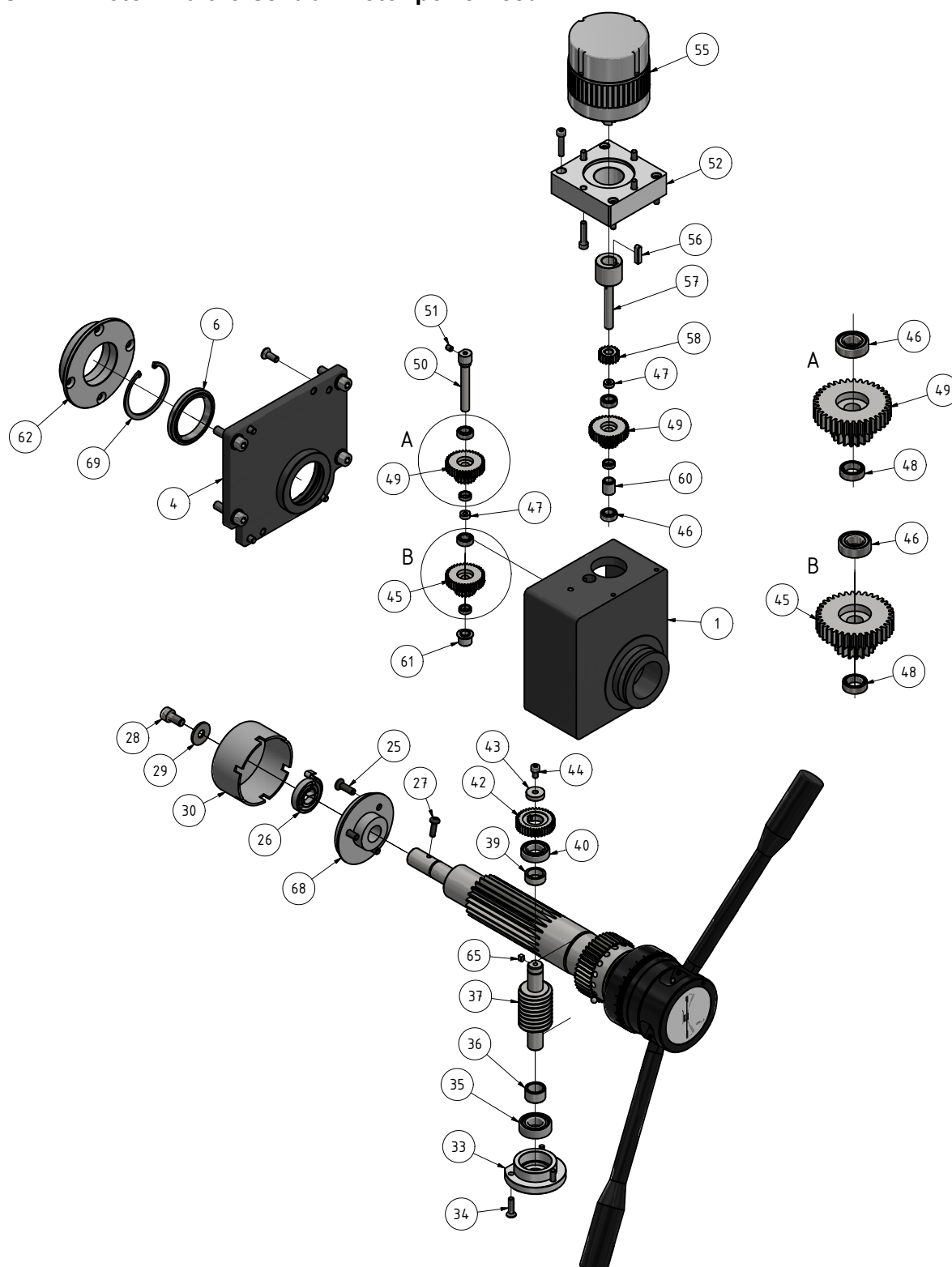
E - Welle E, F - Shaft E, F



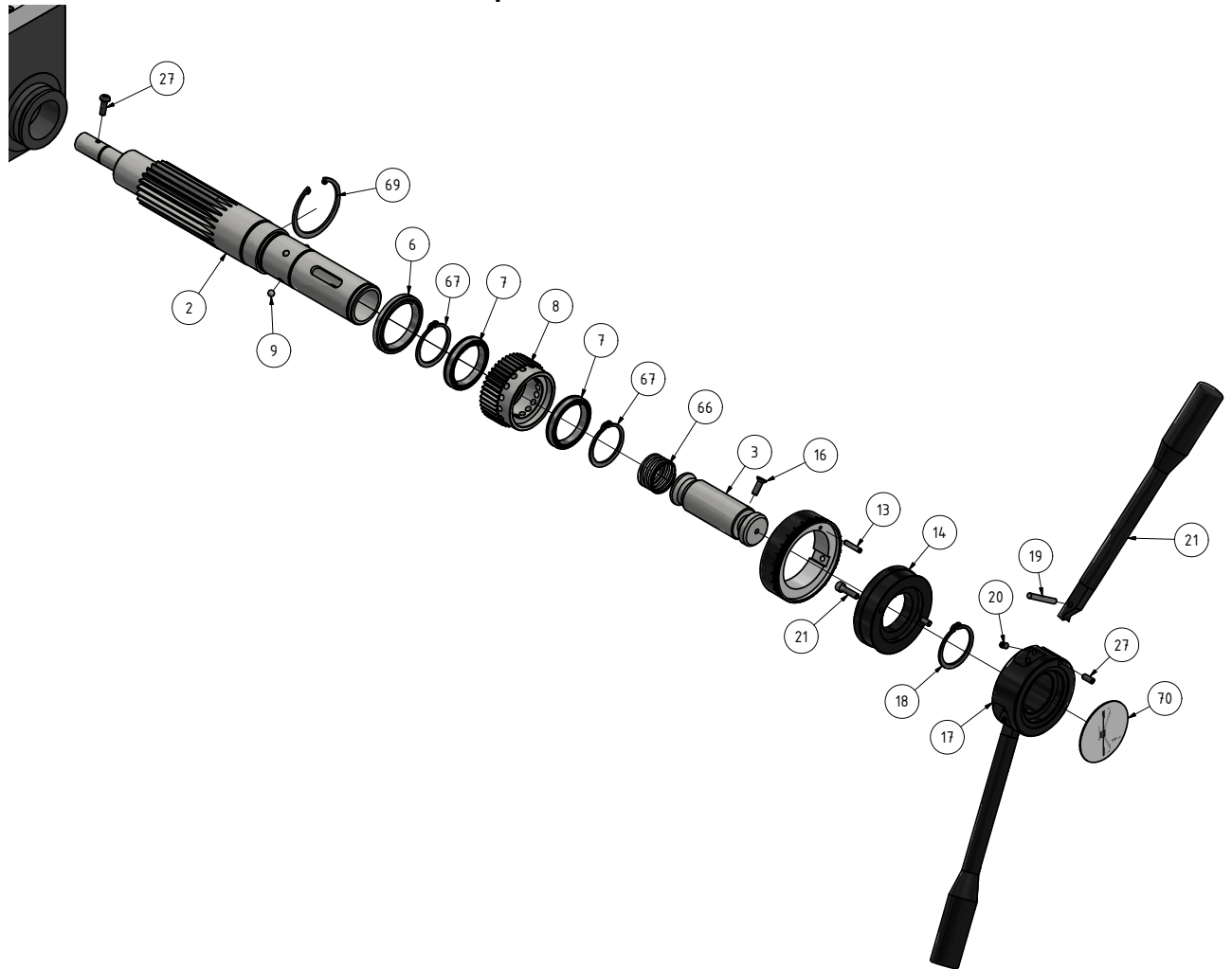
Welle E, F - Shaft E, F					
Pos.	Bezeichnung	Description	Menge Qty.	Grösse Size	Artikelnummer Item no.
15	Stiftschraube	Set screw	2	M6 x 16	
16	Mutter	Nut	2	M6	
39	Stahlkugel	Steel ball	2		0303434939
104	Zylinderstift	Cylindrical pin	1	h8 x 12	03034349104
109	Schaltwelle	Shift shaft	1		03034349109
110	Schaltgabel links	Left shift fork	1		03034349110
111	Hebelbock	Lever bracket	1		03034349111
113	Stiftschraube	Set screw	2	M8 x 12	
114	Welle Hebelhalterung	Lever bracket shaft	1		03034349114
115	Wellendichtring	Shaft seal	2	DIN 3760 - AS - 12 x 24 x 7 - NBR	03034349115
116	Schaltwelle	Shift shaft	1		03034349116
117	Hebelbock	Lever bracket	1		03034349117
118	Schaltgabel rechts	Right shift fork	1		03034349118
156	Getriebe Wahlschalter	Gearbox selector switch	2		03034349156
157	Stiftschraube	Set screw	2	M6 x 12	
167	Fixierscheibe	Locating disc	1		03034349167
171	Pfeilscheibe	Arrow disc	2		03034349171
172	Fixierfeder	Locating spring	2		03034349172
176	Fixierscheibe	Locating disc	1		03034349176
185	Stiftschraube	Set screw	2	M5 x 12	

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G Motor Kraftvorschub - Motor power feed



H Motor Kraftvorschub - Motor power feed

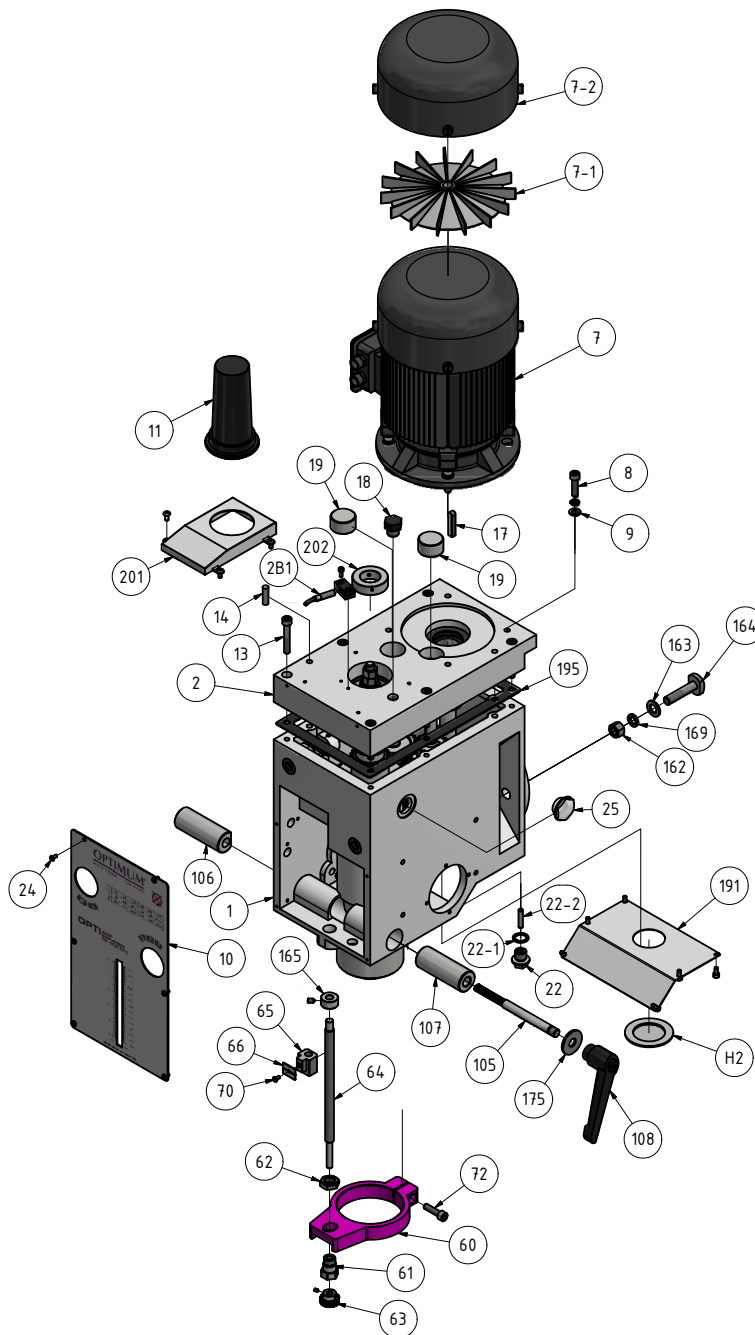


Motor Kraftvorschub - Motor power feed					
Pos.	Bezeichnung	Description	Menge Qty.	Grösse Size	Artikelnummer Item no.
1	Vorschubkasten	Power feed box	1	2144011	030353530301
2	Zahnradwelle	Gear shaft	1	Z21 (2424025)	030353530302
3	Schiebewelle	Sliding shaft	1	2424162	030353530303
4	Box-Grundplatte	Box base plate	1	2424231	030353530304
14	Distanzstück	Spacer	1	2072144	030353530305
17	Sockel	Pedestal	1	2072103	030353530306
6	Rillenkugellager	Deep groove ball bearing	1	61809-ZN	04061809-ZN
7	Skalenring	Scale ring	1	(132mm) 2144170	030353530307
7	Rillenkugellager	Deep groove ball bearing	2	61808-ZN	04061808-ZN
8	Griffstange	Handle bar	2	2424102	030353530308
8	Antriebsrad	Drive gear	1	42x1.5 (2424211)	030353530308
9	Stahlkugel	Steel ball	4	6mm	030353530309
13	Gefederter Zylinderstift	Spring-type straight pin	1	GB/T 879.4-2000 4 x 20	030353530313
16	Senkkopfschraube mit Innensechskant	Hexagon socket countersunk head screw	1	GB/T 70.3 M5 x 16	
18	Innensechskantschraube	Hexagon socket screw	8	ISO 4762 - M5 x 25	
19	Zylindrischer Stift mit Außengewinde	Cylindrical pin with external thread	2	M5 x 25 (2424210)	030353530319
20	Gewindestift mit Innensechskant und flacher Spitze	Hexagon socket set screw with flat point	2	GB/T 77 M5 x 8	030353530320
20	Senkkopfschraube mit Innensechskant	Hexagon socket countersunk head screw	3	M5 x 20	
21	Innensechskantschraube	Hexagon socket cap head screw	2	ISO 4762 - M5 x 20	
22	Innensechskantschraube	Hexagon socket cap head screw	4	M8 x 30	
24	Unterlegscheibe	Plain washer	4	8	
26	Spiralfeder	Spiral spring	1	02-16 A	030353530326

DH40CTPE-3035353_parts.fm

Motor Kraftvorschub - Motor power feed					
Pos. Pos.	Bezeichnung	Description	Menge	Grösse	Artikelnummer
			Qty.	Size	Item no.
27	Flachkopfschraube mit Kreuzschlitz	Flat head screw with cross recess	1	ISO 7045 - M5 x 16 - 4.8 - H	
28	Innensechskantschraube	Hexagon socket screw	1	ISO 4762 - M8 x 16	
29	Unterlegscheibe	Washer	1	DIN 9021 - 8,4	
30	Spiralfederabdeckung	Spiral spring cover	1		030353530330
33	Stützabdeckung	Support cover	1	2144200	030353530333
35	Schräggugellager	Angular contact ball bearing	1	6002-2Z	030353530335
36	Schneckenwellenhülse I	Worm shaft sleeve I	1	2144190	030353530336
37	Schneckenrad	Worm gear	1	Z1 ; m=1.5 (2144081)	030353530337
39	Schneckenwellenhülse II	Worm shaft sleeve II	1	2144120	030353530339
40	Lager	Bearing	1	61902-2Z	040619022Z
42	Zahnrad Z36	Gear Z36	1	2144031	030353530342
43	Vergrößerte Unterlegscheibe	Enlarged washer	1	52144150	030353530343
44	Zylinderkopfschraube mit Innensechskant	Hexagon socket cap head screws	1	M5 x 8	
45	Duplex-Zahnrad	Duplex gear	1	2144180	030353530345
46	Lager	Bearing	4	SKF 628-8-2Z	04062882Z
47	Abstandshalter	Spacer	2	2144061	47
48	Lager	Bearing	3	SKF W637-8-2Z	040W63782Z
49	Duplex-Zahnrad	Duplex gear	2	Z18 Z36 (2144041)	030353530349
50	Zwischenwelle	Intermediate shaft	1	2144091	030353530350
51	Gewindestifte mit Innensechskant und flacher Spitze	Hexagon socket set screws with flat point	1	Screw GB/T 77 M5 x 6	
52	Motorgrundplatte	Motor base plate	1	2144142	030353530352
55	Vorschubmotor	Power feed motor	1	Torque Servo Motor 60AIM25, 200W 2Nm 36V DC 1500RPM	030353530355
56	Passfeder	Feather key	1	GB/T 1096 - C 5 x 5 x 20	030353530356
57	Motorwelle	Motor shaft	1	2144131	030353530357
58	Motorzahnrad	Motor gear	1	Z18 (2144021)	030353530358
60	Motorbuchse	Motor bushing	1	2144071	030353530360
61	Zwischenhülse	Intermediate bushing	1	2144051	030353530361
62	Rechte Endabdeckung	Right end cover	1	2144160	030353530362
65	Passfeder	Feather key	1	4x4x6	030353530365
66	Feder	Spring	1	2072071	030353530366
67	Sicherungsring für Wellen	Circlip for shafts	3	DIN 471 - 40x1,75	
68	Buchse Vorschubgetriebe	Bushing feed gearbox	1		030353530368
69	Sicherungsring	Circlip	1	DIN 472 - 58 x 2	
70	Platte Vorschubhebel	Feed lever plate	1	2077051	030353530370

I - Spindelkopf - Spindle head



Spindelkopf - Spindle head					
Pos.	Bezeichnung	Description	Menge Qty.	Grösse Size	Artikelnummer Item no.
1	Gehäuse	Housing	1		0303535301
2	Abdeckung	Cover	1		0303434902
7	Motor	Motor	1		03338451M1
7-1	Motor Lüfter	Motor fan	1		03034349271
7-2	Motordeckel	Motor cover	1		03034349272
8	Innensechskantschraube	Hexagon socket screw	4	M8x30	
9	Beilagscheibe	Washer	4	8	
10	Frontplatte	Front plate	1		0303535310
11	Abdeckung Anzugsstange	Threaded rod cover	1		030343510211

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Spindelkopf - Spindle head					
Pos. No.	Bezeichnung	Description	Menge	Grösse	Artikelnummer
			Qty.	Size	Item no.
13	Innensechskantschraube	Hexagon socket screw	6	M8 x 50	
14	Kegelstift	Taper pin	2	GB/T 117-2000 A 8 x 30	0303434914
17	Passfeder	Feather key	1	GB/T 1096 - C 8 x 7 x 40	0303434917
18	Belüftungsschraube, Einfüllstopfen	Ventilation screw, filler plug	1	3/8"	0303434918
19	Stopfen	Cap	2		0303434919
22	Ölablassschraube	Oil drain plug	1	3/8"	0303434922
22-1	Dichtring	Seal ring	1	ID 16 x 1.5	03034349221
22-2	Zylinderstift	Cylindrical pin	1	6 x 30	03034349222
24	Rundkopfschraube mit Innensechskant	Round-head screw with hexagon socket	6	GB/T 70.2-2000 M4 x 8	
25	Ölschauglas	Oil sight glass	1		0303434925
60	Vorschubbasis	Feed base	1		0303434960
62	Sechskantmutter	Nut	1	DIN EN 24035 M16	
63	Stellknopf	Setting knob	1		0303434963
64	Gewindestange	Threaded rod	1		0303434964
65	Stellmutter	Setting nut	1		0303434965
66	Tiefenanzeiger	Depth indicator	1		0303434966
70	Schraube	Screw	1	M4x8	
72	Innensechskantschraube	Hexagon socket screw	1	M8 x 30	
105	Klemmstange	Clamping rod	1		03034349105
106	Klemmhülse links	Clamping sleeve left	1		03034349106
107	Klemmhülse rechts	Clamping sleeve right	1		03034349107
108	Klemmhebel	Clamping lever	1		03034349108
162	Mutter	Nut	3	M12	
163	Scheibe	Washer	3	12mm	03034349163
164	Gewindebolzen	Threaded bolt	3	GB/T 37-1988 M12x55	03034349164
165	Hülse	Sleeve	1		03034349165
175	Unterlegscheibe	Washer	1	12mm	03034349175
191	Abdeckblech	Cover sheet	1		03035353191
195	Flachdichtung	Flat gasket	1		03034349195
201	Abdeckung Drehzahlsensor	Speed sensor cover	1	for machines with mm / spindle revolutions setting only	03035353201
202	Drehzahlring	Speed ring			03035353202
2B1	Drehzahlsensor	Speed sensor	1		030353532B1

J Bohrfutterschutz - Drilling chuck protection

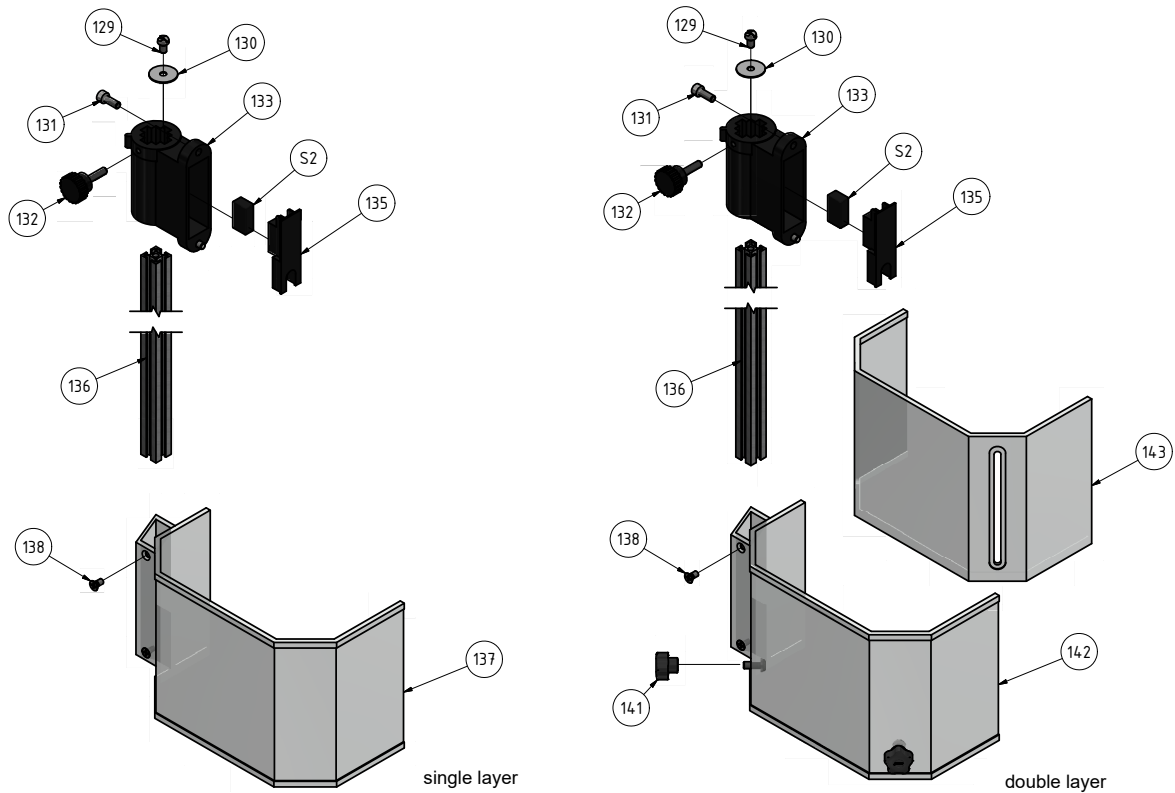
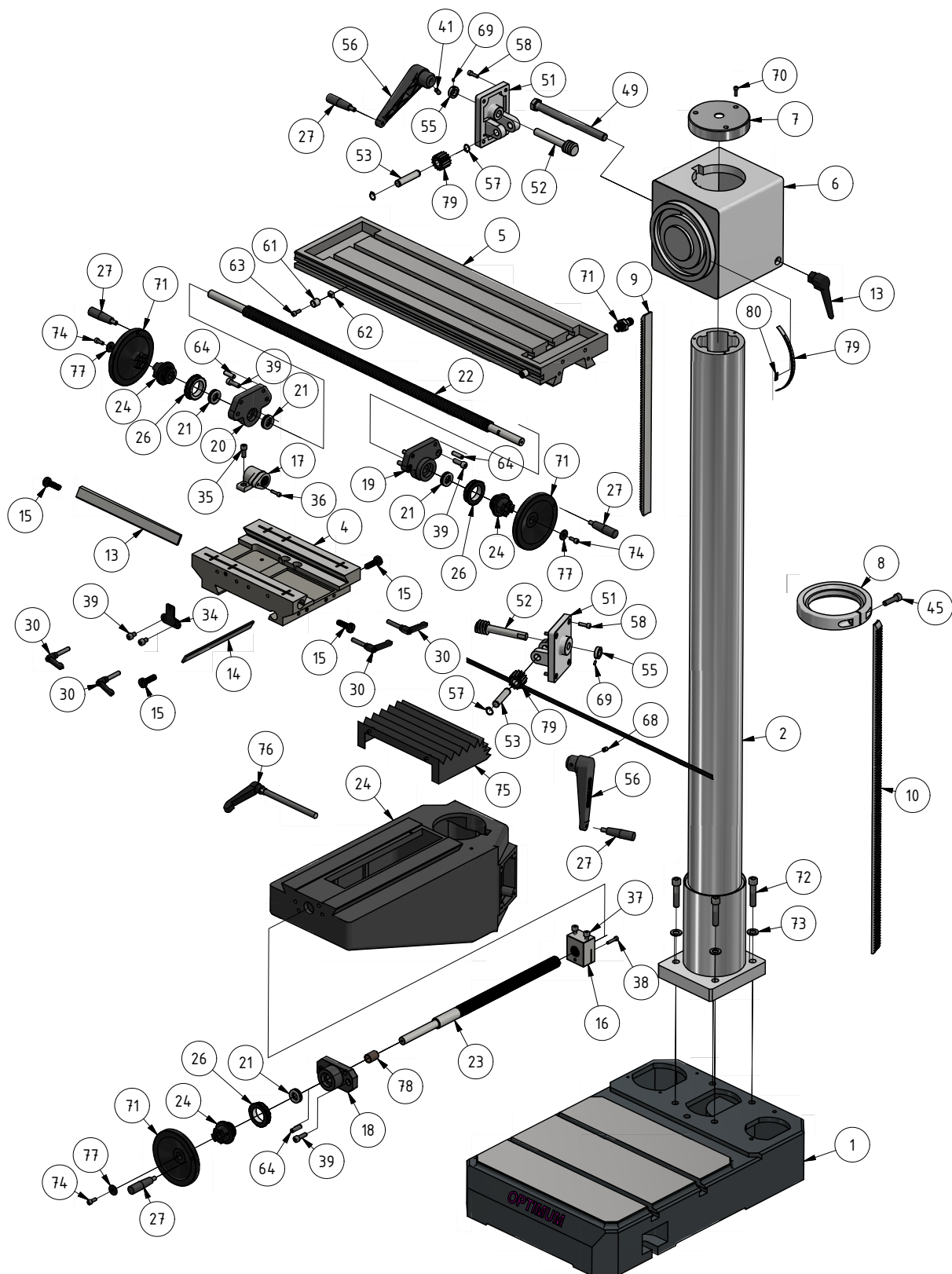


Abb. 7-1: Bohrfutterschutz - Drilling chuck protection

DH40GE, DH40CT, DH40CTP, DH40CTPE - Spindelschutz - Spindle guard					
Pos.	Bezeichnung	Description	Menge Qty.	Grösse Size	Artikelnummer Item no.
129	Sicherheitsschraube	Security screw	1	M6 x 10	
130	Scheibe	Washer	1		
131	Innensechskantschraube	Socket head screw	2	GB 70-85 - M6 x 16	
132	Rändelschraube	Knurled screw	1		
133	Halterung	Fixture	1		0302024149CPL
S2	Mikroschalter	Microswitch	1		03338451SQ1
135	Platte	Plate	1		
136	Alu- Profil	Aluminium profile	1	290mm	0303434904136
137	Bohrfutterschutz	Drill chuck protection	1	single layer	0303434904137
138	Schraube	Screw	2	GB819-85/M5x8	
141	Klemmschraube	Clamping screw	2		0303434904141
142	Bohrfutterschutz vorne	Drill chuck protection front part	1	double layer	0303434904142
143	Bohrfutterschutz hinten	Drill chuck protection rear part	1	double layer	0303434904143
0	Bohrfutterschutz kpl.	Drill chuck protection cpl.	1	single layer	0303434904137cpl
0	Bohrfutterschutz kpl.	Drill chuck protection cpl.	1	double layer	0303434904142cpl

DH40CTPE-3035353_parts.fm

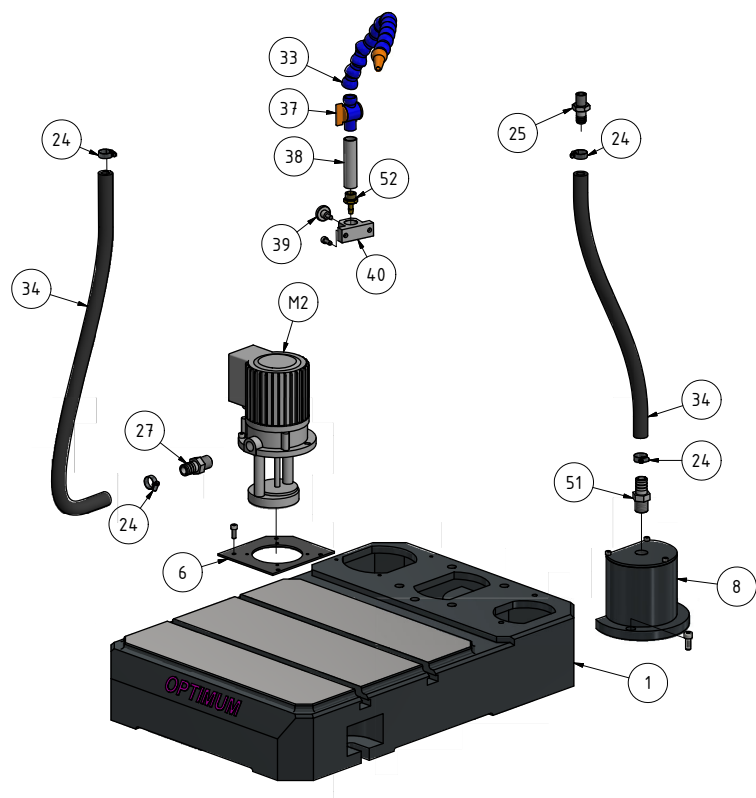
K Säule und Bohrtisch - Column and drilling table



DH40CTPE-3035353_parts.fm

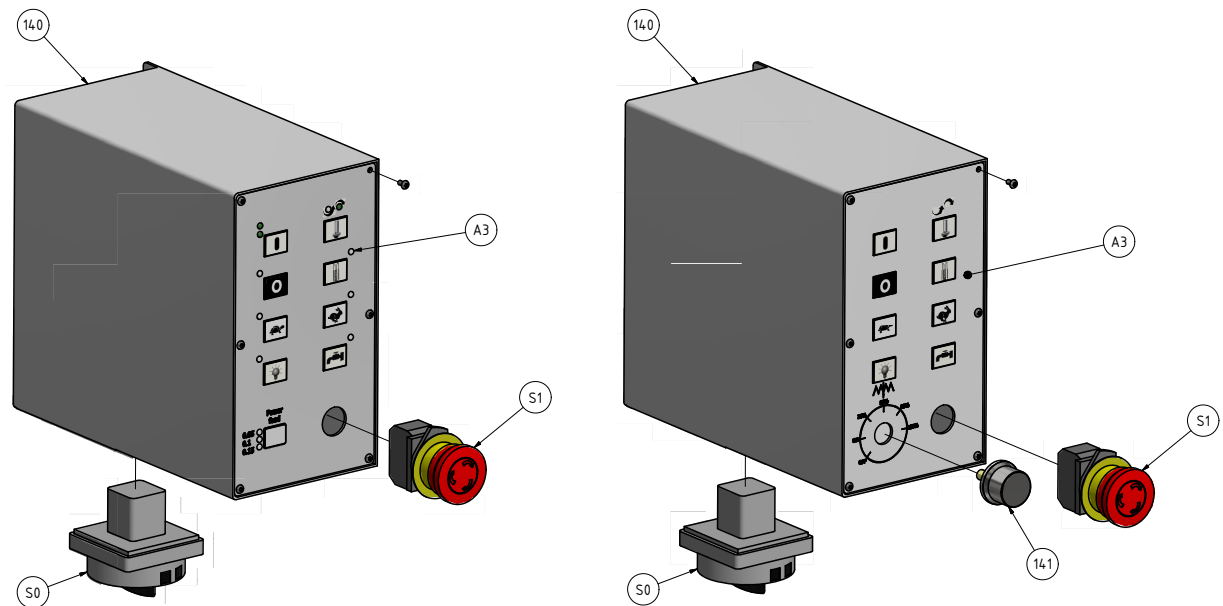
Säule und Bohrtisch - Column and drilling table					
Pos.	Bezeichnung	Description	Menge Qty.	Grösse Size	Artikelnummer Item no.
1	Maschinenfuss	Machine base	1		03034240201
2	Säule	Column	1		03034350202
3	Tischhalter	Table holder	1		03034350203
4	Schliitten	Slip saddle	1		0335660010
5	Bohrtisch	Work table	1		0335660034
6	Fräskopfhalter	Milling head holder	1		03034350206
7	Abdeckung	Cover	1		03034350207
8	Ring	Locked guide ring	1		03034350208
9	Zahnstange kurz	Short rack	1		03034350209
10	Zahnstange lang	Long rack	1		03034350210
13	Keilleiste	Taper gib	1		0335660008
14	Keilleiste	Taper gib	1		0335660026
15	Einstellschraube	Adjust screw	4		0335660009
16	Spindelmutter	Guide screw nut	1		0335660022CPL
17	Spindelmutter	Guide screw	1		0335660007CPL
18	Lagerbock	Bearing klock	1		0335660019
19	Lagerbock	Bearing klock	1		0335660037
20	Lagerbock	Bearing klock	1		0335660020
21	Axiallager	Thrust bearing	4		04051103
22	Spindel	Spindle	1		0335660007CPL
23	Spindel	Spindle	1		0335660022CPL
24	Kupplung	Dial clutch	2		030343490224
26	Skalering	Scale ring	3		030343490226
27	Handgriff mit M8 Welle	Handle with M8 shaft	5		030343490227
30	Spannhebel	Clamping lever	2	M8x50	0335660012
32	Stift	Pin	3	5x35	
34	Block	Fixed block	1		0335660014
35	Schraube	Screw	2	M8x16	
36	Schraube	Screw	1	M5x25	
37	Schraube	Screw	1	M8x45	
38	Schraube	Screw	1	M5x25	
39	Schraube	Screw	8	M8x20	
41	Gewindestift	Threaded pin	2	M8x16	
45	Innensechskantschraube	Hexagon socket screw	1	M10x35	
49	Sechskantschraube	Hexagon socket screw	1	M16 x 200	
51	Halter	Bracket	2		03034350251
52	Schneckenwelle	Worm shaft	2		03034350252
53	Welle	Shaft	2		03034350253
54	Klemmhebel M16	Clamping lever M16	1		03034350254
55	Scheibe	Washer	2		
56	Kurbel	Crank	2		03034350256
57	Sicherungsring	Retaining ring	4	DIN 471 14x1	
58	Innensechskantschraube	Hexagon socket screw	8	M6x20	
60	Innensechskantschraube	Hexagon socket screw	3	M8x12	
61	Endanschlag	Fixed block support	2		
62	Nutenstein	T-slot	2	M6x25	
63	Innensechskantschraube	Hexagon socket screw	2	M6x16	
64	Passtift mit Innengewinde	Dowel pin with internal thread	6	8x28	
69	Gewindestift	Threaded pin	2	M4x5	
70	Innensechskantschraube	Hexagon socket screw	3	M5 x 16	
71	Handrad	Handwheel	3		03034350271
74	Innensechskantschraube	Hexagon socket screw	3	M6 x 16	
76	Klemmhebel	Clamping lever	1		
77	Anschlagscheibe	Stop disc	3		03034350277
78	Distanzhülse	Spacing sleeve	1		03034350278
79	Skala am Drehlager	Scale on swivel bearing	1		03034350279
80	Nullpunktzeiger	Zero pointer	1		03034350280

L Kühlmiteleinrichtung - Coolant device



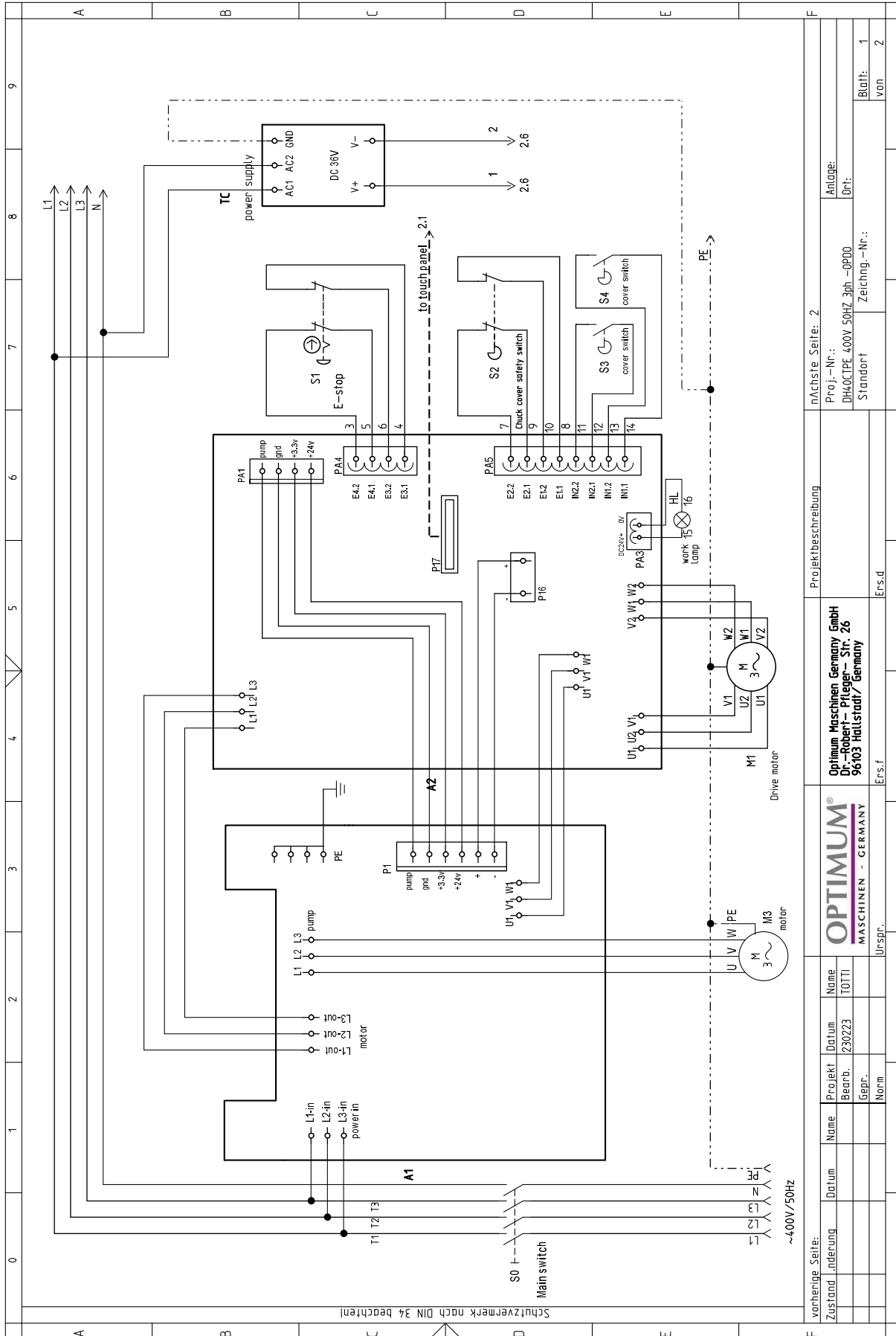
Kühlmiteleinrichtung - Coolant device					
Pos.	Bezeichnung	Description	Menge Qty.	Grösse Size	Artikelnummer Item no.
1	Maschinenfuss	Machine base	1		03034240201
M2	Kühlmittelpumpe	Coolant pump	1		03034340216
6	Platte	Plate	1		03034240206
8	Spänefilter	Chip filter	1		03020285304
24	Schlauchbinder	Hose fitting	4		030353530524
25	Anschluss	Connector	1		030353530525
27	Anschluss	Connector	1		03034240227
33	Kühlmiteleinrichtung	Coolant unit	1		03020285284
34	Kühlmittelschlauch	Coolant hose	2		0333440025
38	Verlängerung	Extension			030353530538
51	Fitting	Fitting	1		030353530551
52	Anschluss	Plug	1		030353530552

M Drucktastenbedienfeld - Push button operating panel



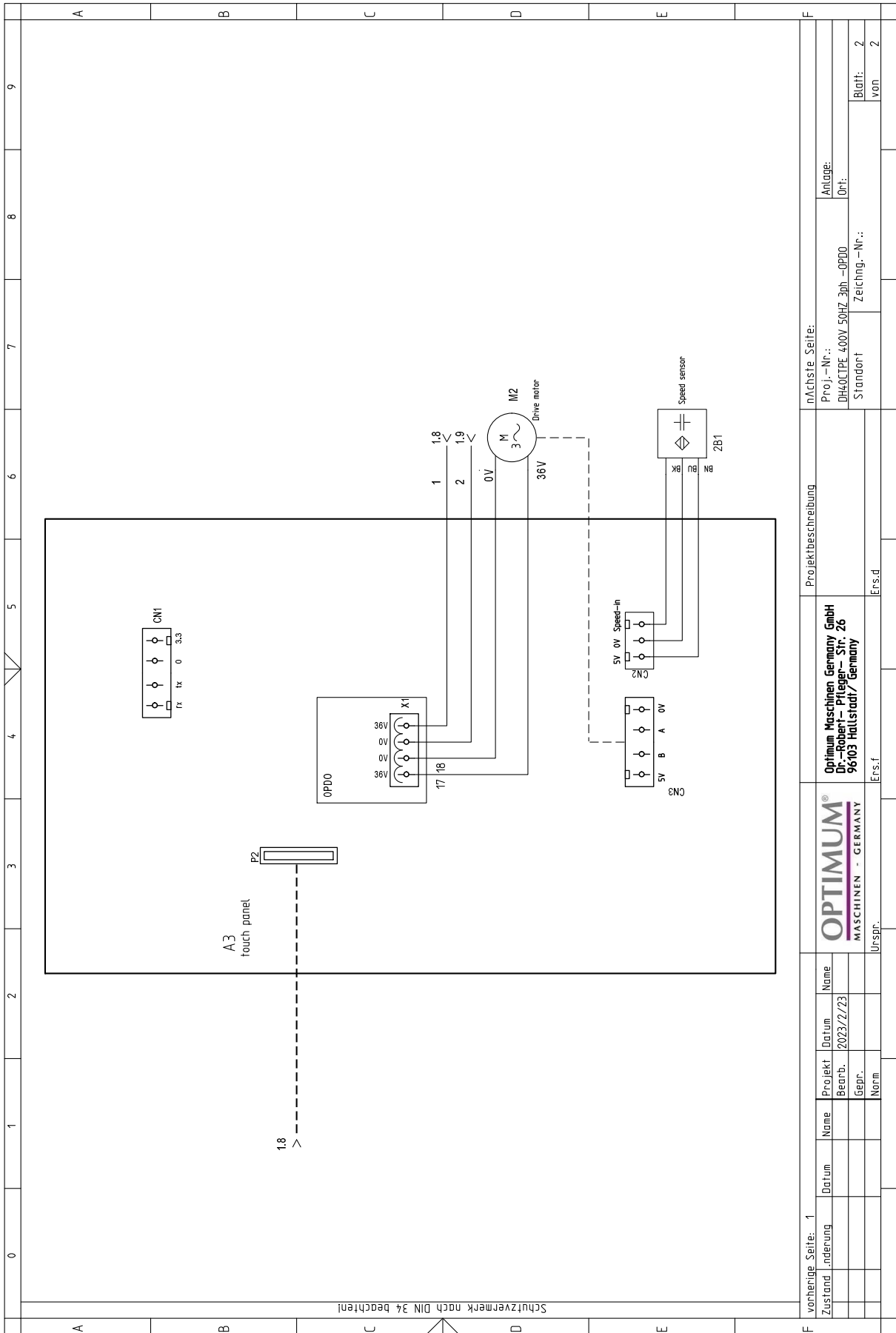
Bedienfeld - Operating panel					
Pos.	Bezeichnung	Description	Menge Qty.	Grösse Size	Artikelnummer Item no.
A3	Drucktastenbedienpanel mit festem Vorschub	Push-button control panel with fixed feed rate	1		03035353A3
	Drucktastenbedienpanel mit stufenlosem Vorschub	Push-button control panel with infinitely variable feed rate	1		03035353A32
140	Schaltbox	Switch box	1		0303535303140
141	Vorschubknopf	Feed knob	1	for infinitely variable feed rate only (knob only)	0303535303141
S1	Not-Halt-Schalter	Emergency stop button	1		03338451SB1
S0	Hauptschalter	Main switch	1		03338451QF1

7.5 Schaltplan Integr. Masch.st - Wiring diagram - Integrated machine control



vorherige Seite:		nachste Seite: 2	
Zustand	nderung	Projekt	Datum
		Bearb.	230223
		Gepr.	
		Norm	
		Urspr.	
		Erstf	
		Erstd	
Projektbeschreibung		Anlage: DH40CTPE 400V 50Hz 3ph -OPD0	
Standort		Zeichng.-Nr.: Blatt: 1 von 2	

DH40CTPE_wiring-push-button-panel.fm



DH40CTPE - Elektrik, Integrierte Maschinensteuerung - Electrical components, Integrated machine control					
Pos.	Bezeichnung	Description	Menge Qty.	Grösse Size	Artikelnummer Item no.
S0	Hauptschalter	Main switch	1	ZH 20	03338451QF1
A1	Panel	Panel	1	OPDO	03035353A1
M1	Antriebsmotor	Drive motor	1	YD90L4/2 1.3 / 1.8 KW	03338451M1
M2	Pumpe	Pump	1	60AIM25 200W 2Nm	03034340216
A2	Integrierte Maschinensteuerung	Integrated machine control	1	DH40CTPE	03035353A2
S1	Not-Halt	E- stop	1	HY57B-17	03338451SB1
S2	Bohrfutterschutz	Chuck cover safety switch	1	QS 7	03338451SQ1
A3	Drucktastenbedienpanel mit festem Vorschub	Push-button control panel with fixed feed rate	1	DH40CTPE	03035353A3
	Drucktastenbedienpanel mit stufenlosem Vorschub	Push-button control panel with infinitely variable feed rate	1	DH40CTPE	03035353A32
H2	Arbeitsleuchte	Work lamp		DC24V 3W	03035353H2
2B1	Drehzahlsensor	Speed sensor	1	PNP NO	030353532B1
S3	Endschalter obere Endlage	Limit switch upper end position	1	V 155-1C25	03338451SQ2
S4	Endschalter unten, Position einstellbar	Limit switch down, position adjustable	1	V 155-1C25	

oil-compare-list.fm

Schmierstoffe Lubricant Lubrifiant	Viskosität Viscosity Viscosité ISO VG DIN 51519 mm²/s (cSt)	Kennzeichnu ng nach DIN 51502							
Getriebeöl Gear oil Huile de réducteur	VG 680	CLP 680	Aral Degol BG 680	BP Energol GR-XP 680	SPARTAN EP 680	Klüberoil GEM 1-680	Mobilgear 636	Shell Omala S2 GX 680	Meropa 680
	VG 460	CLP 460	Aral Degol BG 460	BP Energol GR-XP 460	SPARTAN EP 460	Klüberoil GEM 1-460	Mobilgear 634	Shell Omala S2 GX 460	Meropa 460
	VG 320	CLP 320	Aral Degol BG 320	BP Energol GR-XP 320	SPARTAN EP 320	Klüberoil GEM 1-320	Mobilgear 632	Shell Omala S2 GX 320	Meropa 320
	VG 220	CLP 220	Aral Degol BG 220	BP Energol GR-XP 220	SPARTAN EP 220	Klüberoil GEM 1-220	Mobilgear 630	Shell Omala S2 GX 220	Meropa 220
	VG 150	CLP 150	Aral Degol BG 150	BP Energol GR-XP 150	SPARTAN EP 150	Klüberoil GEM 1-150	Mobilgear 629	Shell Omala S2 GX 150	Meropa 150
	VG 100	CLP 100	Aral Degol BG 100	BP Energol GR-XP 100	SPARTAN EP 100	Klüberoil GEM 1-100	Mobilgear 627	Shell Omala S2 GX100	Meropa 100
	VG 68	CLP 68	Aral Degol BG 68	BP Energol GR-XP 68	SPARTAN EP 68	Klüberoil GEM 1-68	Mobilgear 626	Shell Omala S2 GX 68	Meropa 68
	VG 46	CLP 46	Aral Degol BG 46	BP Bartran 46	NUTO H 46 (HLP 46)	Klüberoil GEM 1-46	Mobil DTE 25	Shell Tellus S2 MX 46	Anubia EP 46
	VG 32	CLP 32	Aral Degol BG 32	BP Bartran 32	NUTO H 32 (HLP 32)	Klübersynth GEM 4- 32 N	Mobil DTE 24	Shell Tellus S2 MX 32	Anubia EP 32
Hydrauliköl Hydraulic oil Huile hydraulique	VG 32	CLP 32	Aral Vitam GF 32	BP Energol HLP HM 32	NUTO H 32 (HLP 32)	LAMORA HLP 32	Mobil Nuto HLP 32	Shell Tellus S2 M 32	Rando HD HLP 32
	VG 46	CLP 46	Aral Vitam GF 46	BP Energol HLP HM 46	NUTO H 46 (HLP 46)	LAMORA HLP 46	Mobil Nuto HLP 46	Shell Tellus S2 M 46	Rando HD HLP 46
Getriebefett Gear grease Graisse de réducteur		G 00 H-20	Aral FDP 00 (Na-verseift) Aralub MFL 00 (Li-verseift)	BP Energ grease PR-EP 00	FIBRAX EP 370 (Na-verseift)	MICROLUB E GB 00	Mobilux EP 004	Shell Alvania GL 00 (Li-verseift)	Marfak 00

Spezialfette, wasserabweisend Special greases, water resistant Graisses spéciales, déperlant			Aral Aralub	Energrease PR 9143		ALTEMP Q NB 50 Klüberpaste ME 31-52	Mobilux EP 0 Mobil Greaserex 47		
Wälzlagerfett Bearing grease Graisse de roulement		K 3 K-20 (Li-verseift)	Aralub HL 3	BP Energrease LS 3	BEACON 3	CENTOPLE X 3	Mobilux 3	Shell Alvania R 3 Alvania G 3	Multifak Premium 3
Öle für Gleitbahnen Oils for slideways Huiles pour glissières	VG 68	CGLP 68	Aral Deganit BWX 68	BP Maccurat D68	ESSO Febis K68	LAMORA D 68	Mobil Vactra Oil No.2	Shell Tonna S2 M 68	Way lubricant X 68
Öle für Hochfrequenzspindeln Oils for Built-in spindles Huiles pour broches à haute vitesse	VG 68		Deol BG 68	Emergol HLP-D68	Spartan EP 68		Drucköl KLP 68-C	Shell Omala 68	
Fett für spezielle Schmierungen an CNC Werkzeugmaschinen (Fließfett) Grease for special lubrication on CNC machine tools Graisse pour lubrification spéciale sur machines- outils CNC	NLGI Klasse 000 NLGI class 000		ARALUB BAB 000	Grease EP 000	Shell Gadus S4 V45AC	CENTOPLE X GLP 500	Mobilux EP 023		Multifak 264 EP 000
Fett für Hochfrequenzspindeln Grease for Built-in spindles Graisse pour broches à haute vitesse	METAFLUX-Fett-Paste (Grease paste) Nr. 70-8508 METAFLUX-Moly-Spray Nr. 70-82 Techno Service GmbH ; Detmolder Strasse 515 ; D-33605 Bielefeld ; (++49) 0521- 924440 ; www.metaflux-ts.de								
Kühlschmiermittel Cooling lubricants Lubrifiants de refroidissement			Aral Emusol	BP Sevora	Esso Kutwell		Mobilcut	Shell Adrana	Chevron Soluble Oil B

8 Malfunctions

Malfunction	Cause/ possible effects	Solution
Noise during work.	- Spindle runs dry. - Tool blunt or incorrectly clamped.	- Grease spindle - Use new tool and check tension (fixed setting of the bit, drill chuck and taper mandril)
Bit „burnt“	- Incorrect speed - Chips are not coming out of the drilled hole. - Blunt drill bit. - Operating without cooling agent.	- Choose a different speed, excessive feed. - Retract the drill bit from the bore hole more often. - Sharpen the drill bit or insert new drill bit. - Use coolant.
Drill point runs off, drilled hole is not circular.	- Hard material or length of the cutting spirals/or angles on the tool are unequal - Drill bit is bent.	Use a new drill bit.
Drill bit defective.	No base / support used.	Place a piece of wood underneath the workpiece and fasten this to the workpiece.
Drill is running non-round or shaking	- Drill bit is bent. - Bearings worn down in the spindle head. - Drill is not correctly clamped. - Drill chuck defective	- Replace drill bit - Have the bearings in the spindle head replaced. - Clamp the drill bit properly. - Replace the drill bit chuck.
The drill chuck or the taper mandrel cannot be inserted.	Dirt, grease or oil on the taper inside of the drill chuck or on the taper surface of the drill spindle	- Clean surfaces well. - Keep surfaces free from grease.
Motor does not start.	- Motor is wrongly connected - Defective fuse.	Have it checked by qualified personnel.
Motor is overheating and there is no power.	- Motor overloaded ? - Too low mains voltage - Motor is wrongly connected	- Reduce feed, disconnect if necessary and have it checked by authorised personnel. - Have it checked by authorised personnel.
Precision of the work deficient.	- Heavy and unbalanced or deformed work-piece. - Inexact horizontal position of the work-piece holder.	- Balance the piece statically and secure without straining - Adjust workpiece-holder
Spindle bearing overheating	- Bearing worn down - Bearing pretension is too high - Working at high speeds for a long time.	- Replacing - Increase bearing clearance for fixed bearing (taper roller bearing) - Reduce feed

Malfunction	Cause/ possible effects	Solution
Rattle the spindle if the workpiece surface is rough.	- Excessive slack in bearing. - Spindle moves up and down - Adjustment strip loose - Chuck loose. - Tool is blunt. - The workpiece is not fastened.	- Readjust the bearing slack or replace the bearing. - Readjust bearing clearance (fixed bearing) ? - Adjust strip to the correct slack using the adjusting screw - Check, re-tighten - Sharpen or renew the tool. - Clamp the workpiece firmly.

9 Appendix

9.1 Copyright

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Subject to technical changes without notice.

9.2 Terminology/Glossary

Term	Explanation
Drill sleeve	Fixed hollow shaft which runs in the drill spindle.
Spindle	Shaft activated by the motor
Drill chuck	Drill bit adapter can be fixed by hand.
Drill chuck	Drill bit adapter
Drill drift	Tool to release the bit or the drill chuck from the drill spindle
Taper mandrel	Cone of the drill or of the drill chuck
Tool	Drill bit, countersink, etc.
Workpiece	Part to be drilled, part to be machined.
Drilling table	Supporting surface, clamping surface
Spindle head	Upper part of the drilling- milling machine
Quill lever	Manual operation for the drill feed

9.3 Storage

ATTENTION!

Incorrect and improper storage might result in damage or destruction of electrical and mechanical machine components.

Store packed and unpacked parts only under the intended environmental conditions.

Follow the instructions and information on the transport crate:



- m Fragile goods
(Goods require careful handling)



- m Protect against moisture and humid environment
 - Environmental conditions on page 18



- m Prescribed position of the packing case (Marking of the top surface - arrows pointing to the top)



m Maximum stacking height

Example: not stackable - do not stack further packing case on top of the first one.



Consult Optimum Maschinen Germany GmbH if the machine and accessories are stored for more than three months or are stored under different environmental conditions than those specified here.

9.4 Liability claims/warranty

Besides the legal liability claims for defects of the customer towards the seller, the manufacturer of the product, OPTIMUM GmbH, Robert-Pfleger-Straße 26, D-96103 Hallstadt, does not grant any further warranties unless they are listed below or were promised as part of a single contractual provision.

- Liability or warranty claims are processed at OPTIMUM GmbH's discretion either directly or through one of its dealers.
Any defective products or components of such products will either be repaired or replaced by components which are free from defects. Ownership of replaced products or components is transferred to OPTIMUM Maschinen Germany GmbH.
- The automatically generated original proof of purchase which shows the date of purchase, the type of machine and the serial number, if applicable, is the precondition in order to assert liability or warranty claims. If the original proof of purchase is not presented, we are not able to perform any services.
- Defects resulting from the following circumstances are excluded from liability and warranty claims:
 - Using the product beyond the technical options and proper use, in particular due to overstraining of the machine.
 - Any defects arising by one's own fault due to faulty operations or if the operating manual is disregarded.
 - Inattentive or incorrect handling and use of improper equipment
 - Unauthorized modifications and repairs
 - Insufficient installation and safeguarding of the machine
 - Disregarding the installation requirements and conditions of use
 - atmospheric discharges, overvoltage and lightning strokes as well as chemical influences
- Neither are the following items covered by liability or warranty claims:
 - Wearing parts and components which are subject to normal and intended wear, such as V-belts, ball bearings, lighting, filters, seals, etc.
 - Non reproducible software errors
- Any services, which OPTIMUM GmbH or one of its agents performs in order to fulfil any additional warranty are neither an acceptance of the defects nor an acceptance of its obligation to compensate. Such services neither delay nor interrupt the warranty period.
- The court of jurisdiction for legal disputes between businessmen is Bamberg.
- If any of the aforementioned agreements is totally or partially inoperative and/or invalid, a provision which nearest approaches the intent of the guarantor and remains within the framework of the limits of liability and warranty which are specified by this contract is deemed agreed.

9.5 Advice for disposal / Options of reuse:

Please dispose of your equipment in an environmentally friendly manner, by not placing waste in the environment but in a professional manner.

Please do not simply throw away the packaging and later the disused machine, but dispose of both in accordance with the guidelines laid down by your city council/local authority or by an authorised disposal company.

9.5.1 Decommissioning

CAUTION!

Used devices need to be decommissioned in a professional way in order to avoid later misuses and endangerment of the environment or persons.



- Unplug the power cord.
- Cut the connection cable.
- Remove all operating materials from the used device which are harmful to the environment.
- If applicable remove batteries and accumulators.
- Disassemble the machine if required into easy-to-handle and reusable assemblies and component parts.
- Dispose of machine components and operating fluids using the intended disposal methods.

9.5.2 Disposal of new device packaging

All used packaging materials and packaging aids from the machine are recyclable and generally need to be supplied to the material reuse.

The packaging wood can be supplied to the disposal or the reuse.

Any packaging components made of cardboard box can be chopped up and supplied to the waste paper collection.

The films are made of polyethylene (PE) and the cushion parts are made of polystyrene (PS). These materials can be reused after reconditioning if they are passed to a collection station or to the appropriate waste management enterprise.

Only forward the packaging materials correctly sorted to allow direct reuse.

9.5.3 Disposal of the old device

INFORMATION

Please take care in your interest and in the interest of the environment that all component parts of the machine are only disposed of in the intended and admitted way.

Please note that the electrical devices comprise a variety of reusable materials as well as environmentally hazardous components. Please ensure that these components are disposed of separately and professionally. In case of doubt, please contact your municipal waste management. If appropriate, call on the help of a specialist waste disposal company for the treatment of the material.



9.5.4 Disposal of electrical and electronic components

Please make sure that the electrical components are disposed of professionally and according to the statutory provisions.

The device is composed of electrical and electronic components and must not be disposed of as household waste. According to the European Directive regarding electrical and electronic used devices and the implementation of national legislation, used power tools and electrical machines need to be collected separately and supplied to an environmentally friendly recycling centre.

As the machine operator, you should obtain information regarding the authorised collection or disposal system which applies for your company.

Please make sure that the electrical components are disposed of professionally and according to the legal regulations. Please only throw depleted batteries in the collection boxes in shops or at municipal waste management companies.

9.5.5 Disposal of lubricants and coolants

ATTENTION!

Please imperatively make sure to dispose of the used coolant and lubricants in an environmentally compatible manner. Observe the disposal instructions of your municipal waste management companies.



INFORMATION

Used coolant emulsions and oils should not be mixed since it is only possible to reuse oils without pre-treatment when they have not been mixed.

The disposal instructions for used lubricants are made available by the manufacturer of the lubricants. If necessary, request the product-specific data sheets.



9.6 Disposal via municipal collection facilities

Disposal of used electrical and electronic components

(Applicable in the countries of the European Union and other European countries with a separate collecting system for those devices).

The sign on the product or on its packing indicates that the product must not be handled as common household waste, but that it needs to be disposed of at a central collection point for recycling. Your contribution to the correct disposal of this product will protect the environment and the public health. Incorrect disposal constitutes a risk to the environment and public health. Recycling of material will help reduce the consumption of raw materials. For further information about the recycling of this product, please consult your District Office, municipal waste collection station or the shop where you have purchased the product.



9.6.1 Change information operating manual

Chapter	Short summary	new version number
4.8.1	Illustration and description for variable feed speed	1.0.1

9.7 Product follow-up

We are required to perform a follow-up service for our products which extends beyond shipment.

We would be grateful if you could send us the following information:

- ☐ Modified settings
- ☐ Any experiences with the milling machine which might be important for other users
- ☐ Recurring malfunctions

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EC - Declaration of Conformity

according to Machinery Regulation 2023/1230 Annex V Part A

The manufacturer /
distributor: Optimum Maschinen Germany GmbH
Dr.-Robert-Pfleger-Str. 26
D - 96103 Hallstadt, Germany

hereby declares that the following product

Product designation: Drilling and milling machine

Type designation: DH40CTPE

Manual drilling milling machine for private persons, as well as for craft and industrial plants which meets all the relevant provisions of the above mentioned Machinery Regulation as well as the other directives applied (below) including their amendments in force at the time of declaration.

The following additional EU Directives have been applied:

EMC Directive 2014/30/EU ; Restriction of the use of certain hazardous substances in electrical and electronic equipment 2015/863/EU

The following harmonized standards were applied:

EN 12717: 2009-07 Machine tools - Safety - Drilling machines

EN ISO 16090-1:2019-12 Machine tools safety - Machining centres, Milling machines, Transfer machines - Part 1: Safety requirements

EN 60204-1:2019-06 Safety of machinery - Electrical equipment of machines - Part 1: General requirements

EN ISO 13849-1:2016-06 Safety of machinery - Safety-related parts of control systems

EN ISO 12100:2011-03 Safety of machinery - General principles for design - Risk assessment and risk reduction

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Kilian Stürmer
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Hallstadt, 2024-02-19

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